THE INDEPENDENT GUIDE TO IBM PERSONAL COMPUTERS

PC

Volume 3 Number 17
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September 4, 1984

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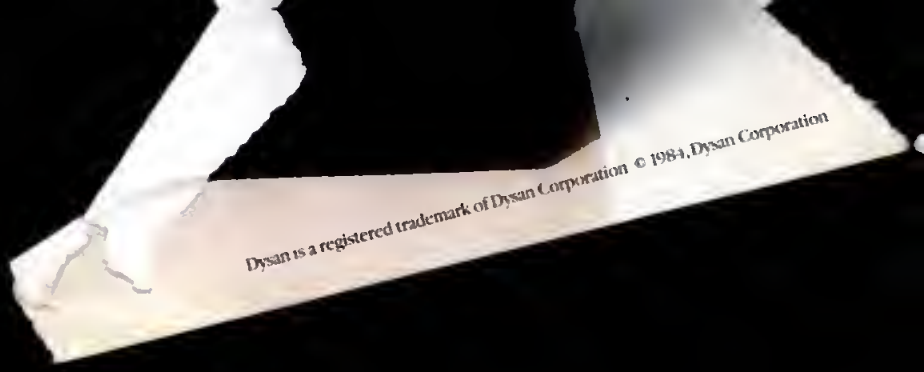
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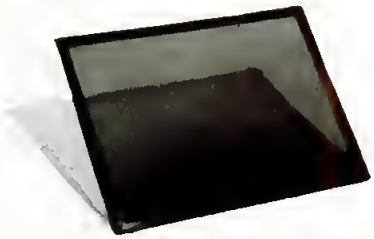

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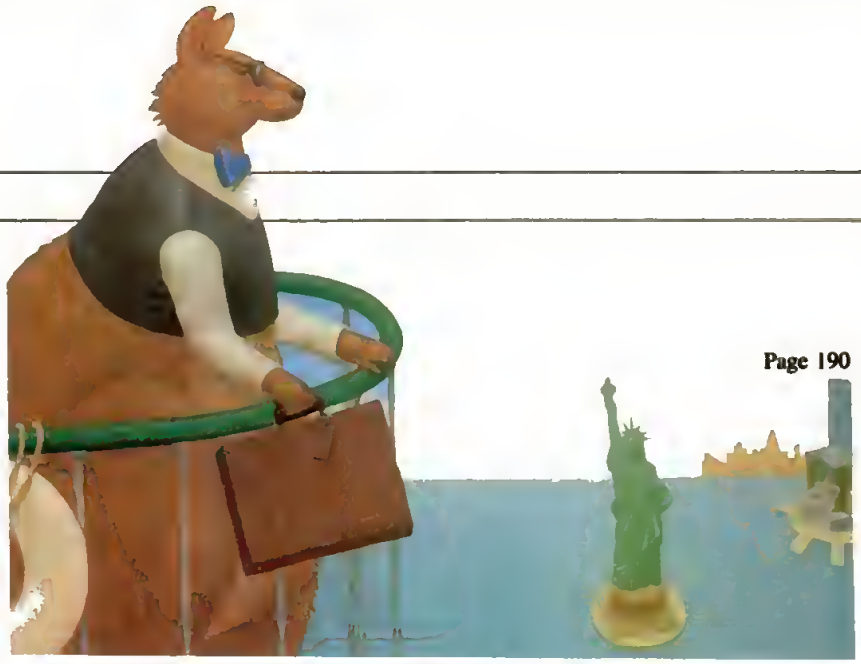
SEPTEMBER 4, 1984



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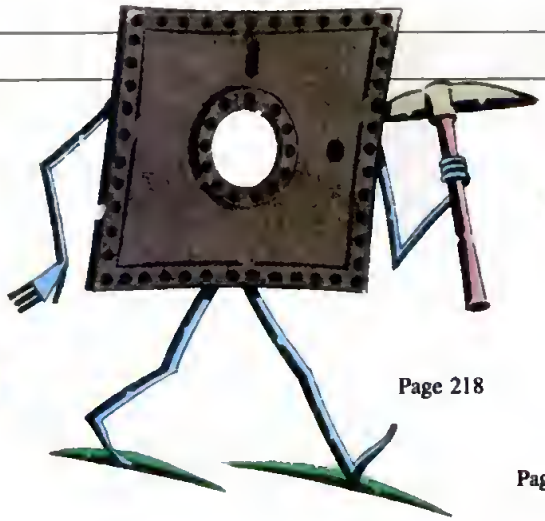

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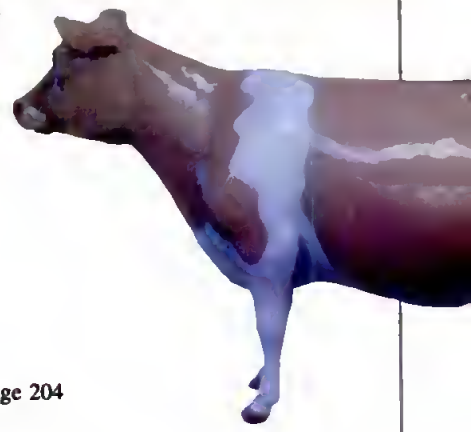

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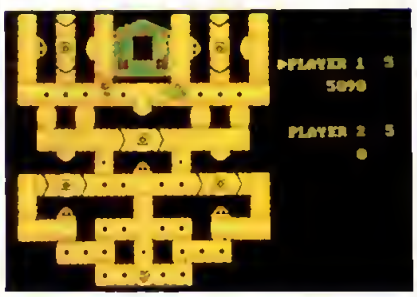

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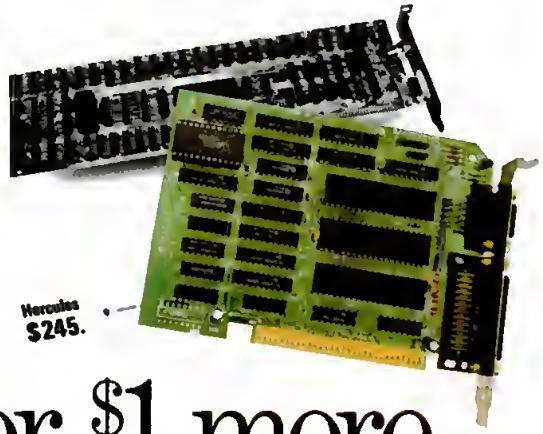

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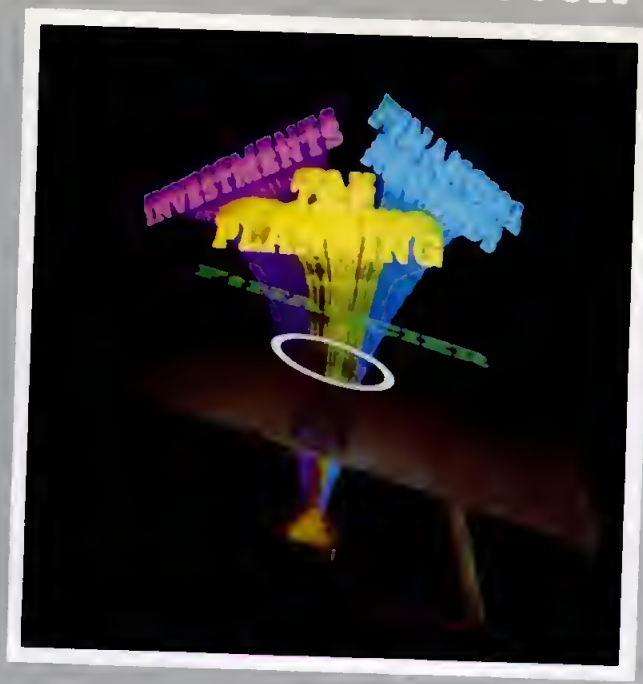

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Reviewer, SOFTALK
June, 1983

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Steven Yoder and
Sherry Knight, CPA
PC Magazine, February, 1983

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Money, June, 1983

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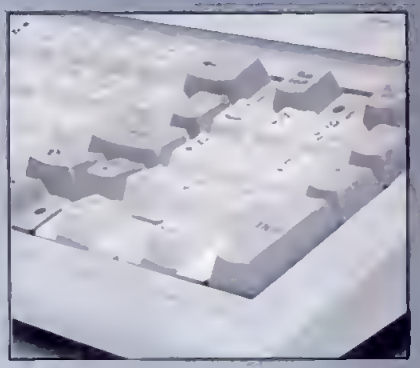

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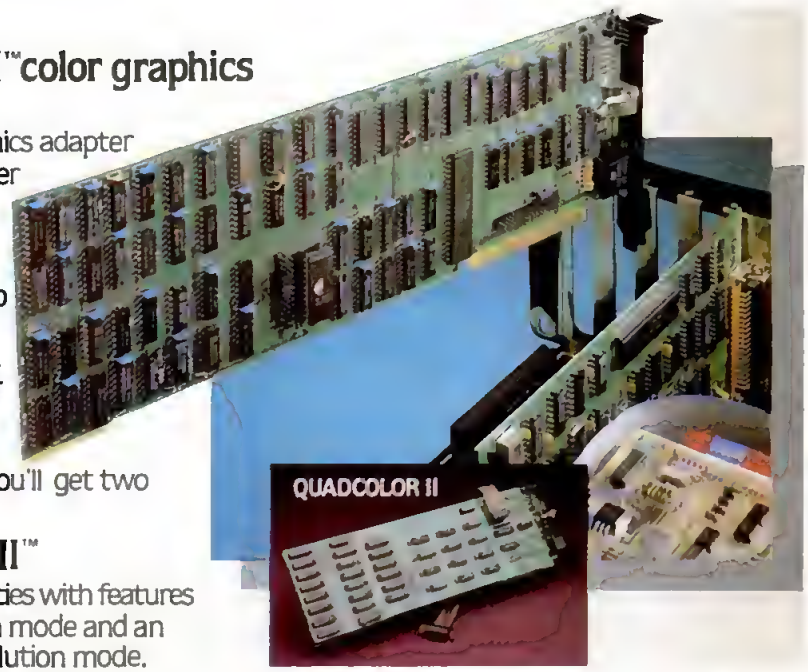
Quadram Has Created The Perfect Color Scheme...For Quality Color Graphics From Start To Finish.

Start with Quadcolor I™ color graphics adapter board

Quadcolor is the only color graphics adapter board your IBM PC or XT will ever need. To begin, snap Quadcolor I into your PC to drive any type color monitor. You get 32K of memory for up to 16 active video pages in the 40-column text mode. Or 8 pages in 80-column. That's twice what other popular cards offer. Switch to graphics mode and create two complete screen pages in memory. Plus, you'll get two true colors in high resolution.



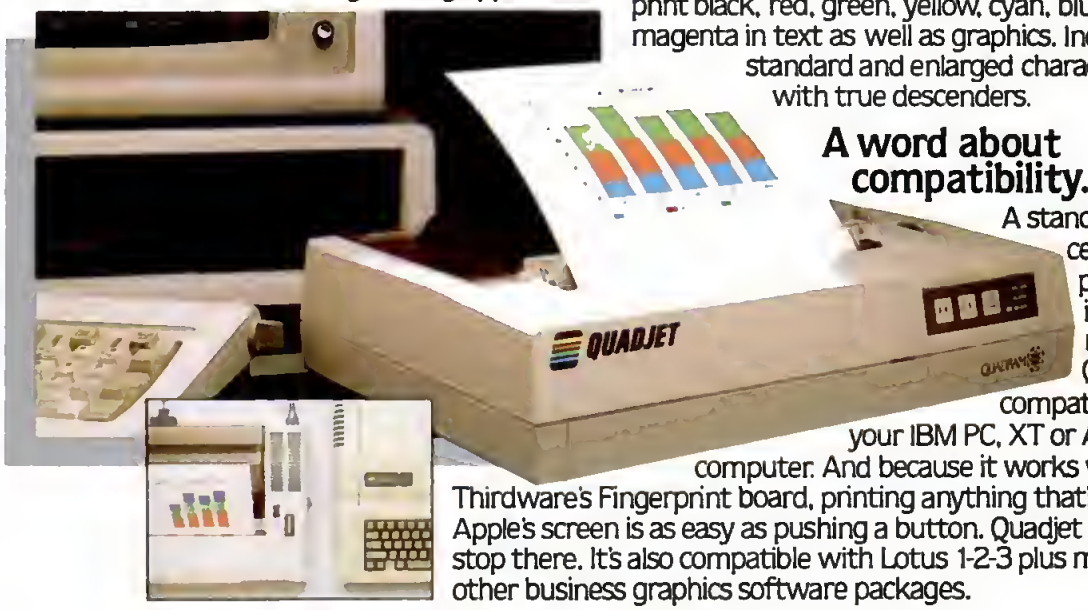
Grow with Quadcolor II™

Quadcolor II expands your capabilities with features like a full 16 color high resolution mode and an amazing 136 color medium resolution mode. And it comes complete with BASICQ the software package that enhances IBM's own BASICA capabilities. When you're in the mood for fun and games, Quadcolor II even has a game port.

Choose Quadjet™ for your color graphics hard copy

Quadjet ink jet printer takes all your ideas and puts them down on paper—or transparencies. So business, scientific and engineering applications are clearer and more meaningful. And it includes an easy-to-use software package which allows you to get down to business right away.

Quadjet uses plain paper or clay coated paper for the ultimate in quality color printing. You can print black, red, green, yellow, cyan, blue or magenta in text as well as graphics. Including standard and enlarged characters with true descenders.



A word about compatibility.

A standard centronics parallel interface makes Quadjet compatible with your IBM PC, XT or Apple computer. And because it works with Thirdware's Fingerprint board, printing anything that's on Apple's screen is as easy as pushing a button. Quadjet doesn't stop there. It's also compatible with Lotus 1-2-3 plus many other business graphics software packages.

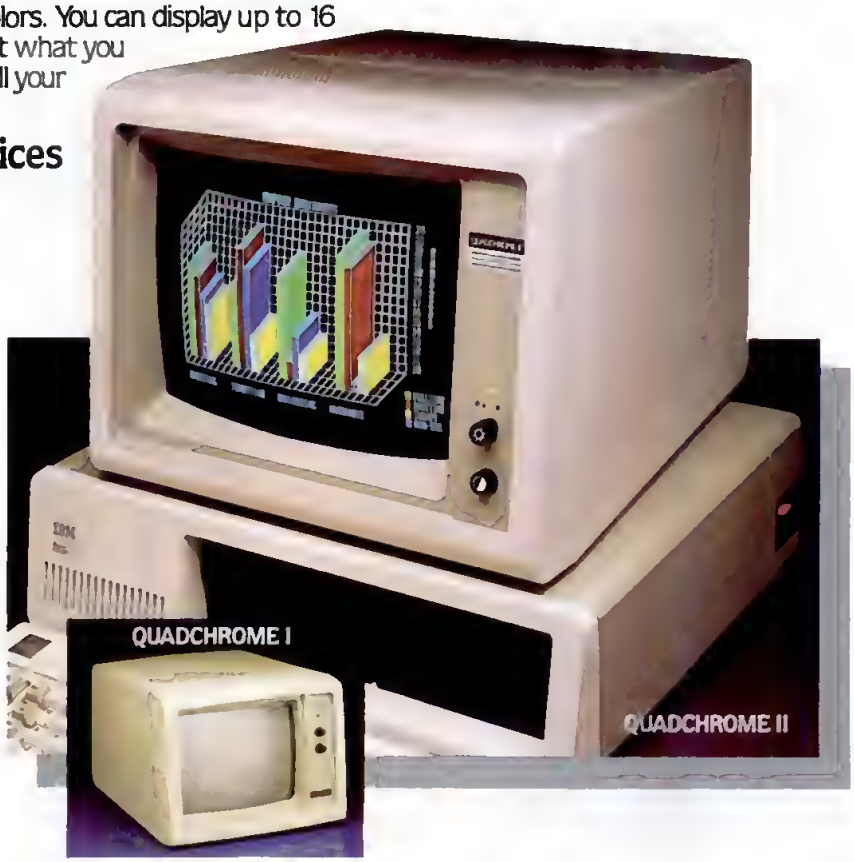
Picture Quadchrome™ as your high resolution color monitor

Quadchrome II is Quadram's latest RGB color monitor with a bigger, better 14" diagonal screen. It delivers up to 640 x 240 resolution with 80 characters by 25 lines. It's sharp, clear screen is perfect for all your business needs. Word processing. Accounting. You name it.

What's more, you'll love the colors. You can display up to 16 different colors at once. It's just what you need to add that extra flair to all your graphics work.

Monitoring your choices

The original Quadchrome I is still available. It delivers up to 690 x 480 in interlaced mode, with the same sharp image and the same colors. Only this time you'll get it on a 12" diagonal, non-glare screen. Of course, both Quadchrome I and II are FCC and UL approved. And for the best monochrome monitor around, there's Quadram's Amberchrome. The new amber monochrome monitor for the IBM PC.



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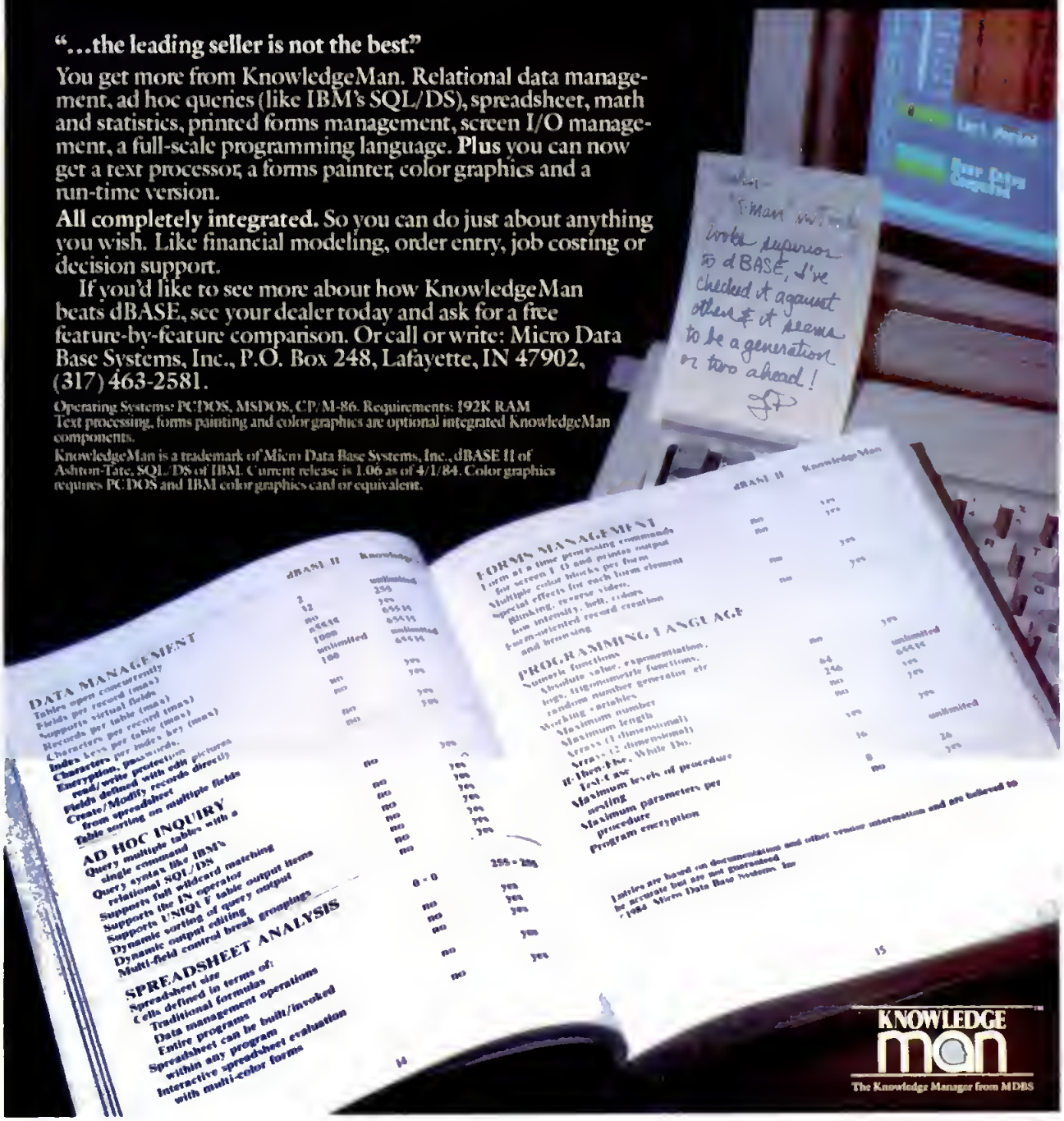
All completely integrated. So you can do just about anything you wish. Like financial modeling, order entry, job costing or decision support.

If you'd like to see more about how KnowledgeMan beats dBASE, see your dealer today and ask for a free feature-by-feature comparison. Or call or write: Micro Data Base Systems, Inc., P.O. Box 248, Lafayette, IN 47902, (317) 463-2581.

Operating Systems: PCDOS, MSDOS, CP/M-86. Requirements: 192K RAM
Text processing, forms painting and color graphics are optional integrated KnowledgeMan components.

KnowledgeMan is a trademark of Micro Data Base Systems, Inc., dBASE II of Ashton-Tate, SQL/DS of IBM. Current release is 1.06 as of 4/1/84. Color graphics requires PCDOS and IBM color graphics card or equivalent.



CIRCLE 525 ON READER SERVICE CARD

What's Inside

Magazines can have growing pains too, and new offices, PC Day West, and two major software surveys worked together to make this issue of PC a true learning experience.

Everybody, at one time or another, must go through that uncomfortable stage of existence known as adolescence. We all survived those years between childhood and adulthood, and most of us remember all too well how rocky and fraught with upheaval that period can be.

Well, magazines can have growing pains too, and *PC*'s were all too obvious to us as its editors put together this issue. Amid the usual mishaps, we were faced with the prospect of assembling an issue with two—count em, two—major software surveys: the final installment of "Project: Database" and a rundown on 19 of the most popular word processing programs on the market.

This state of confusion has been exacerbated by the approach of moving day. No, you don't have to check the address at the front of the magazine: we're still at One Park Avenue, and we hope to stay there for some time to come. However, the staff of *PC Magazine* is exchanging its cramped quarters on the seventh floor for more commodious offices on the fourth floor.

Shangri-La

This change did not come as a complete surprise; in fact, we have been looking forward to resettling in spanking new offices since December. But the

move has been postponed so many times that among staff members it has assumed the mythical status of Shangri-La—nobody *really* believed we would ever get to see it. When we found at the end of June that we were not only finally moving, but that we had to pack in the midst of turning out this issue, we all felt a little bit like ostriches and started searching desperately for a stray bit of sand to stick our heads in.

In the middle of all this, plans went ahead for *PC* Day West. *PC* Day East, during which *PC* editors met with our many free-lance writers on the East Coast to discuss the magazine's direction, had already been a smashing success. So, to be fair to the other coast, most of the senior editorial staff—editor Bill Machrone, executive editors Mike Edelhart and Connie Winkler, managing editor Barry Owen, and manager of copy editing Anne Freed—hopped a plane to California. This left associate editor Stephanie Stallings to mop up "Project: Database," associate editor Barbara Krasnoff to wrestle with the word processing project, and assistant managing editor Susan Hurley to ride herd over both.

The word processing project was more of a case of cut and paste than edit and proofread. All 10 of the writers who reviewed the 19 word processors involved in the study were asked to fill out complex questionnaires covering most of the important functions a word processor is expected to perform. They also wrote short explanations of exactly how to manipulate the programs to get them to perform each of those functions.

Once all the questionnaires and reviews were in, Krasnoff and editorial assistant Roz Tobias set to work. Since the writers had reviewed the software package by package, and the format of the article demanded that the software be reviewed function by function, the reviews had to be physically cut and pasted back together again in a legible and coherent fashion.

Photograph: Dennis Chalkin

Marathon

Then it was the copy editors' turn. In a 2-day marathon that was little short of heroic, they turned a hodge-podge of technical directions, opinions, and writing styles into a consistent and readable group of function descriptions. The result of that effort is what we feel is an informative and useful survey of the state of the word processor market.

The last part of "Project: Database" covers the databases that are so sophisticated and complex that they come under Category 4. That is they have a procedural language or the equivalent, they can handle two or more files at a time, plus they possess additional bells and whistles.

Many of these products are really application generators rather than mere database managers. Many include other utilities, such as compilers, communications, editors, graphics, and occasionally even their own operating systems.

In fact the complexity of one of the products almost brought the whole project to a screeching halt. As the manuscript deadline approached, Stallings casually called one of the authors to confirm the manuscript's arrival time. The author, with trepidation in his voice, informed her that events had cospired to prevent him from even beginning to examine the database. Worse yet, he did not think he would be able to do the work at all.

Stallings hit the ceiling. The manuscript had to be on the managing editor's desk in 3 working days, and she had nobody to write it. Obviously, a command decision was needed. Stallings called in Bill Machrone to inform him of the situation. The only solution was to do a group review of the software package within the offices of *PC*.

Fortunately, that wasn't necessary. On the following Monday, the original reviewer called back to say that the review was completed. He had reorganized his entire schedule to devote the weekend to completing his assignment for *PC*. Not only was the review submitted in the nick of time, but it one of the best-written pieces in the group!

In this way, *PC* has weathered a rather stormy period in its growth. But like many who have had a difficult adolescence, the final result is (we modestly feel) quite outstanding. ■

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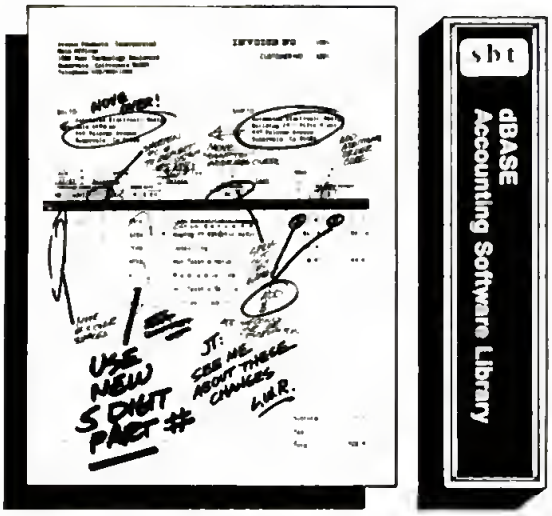

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Friday! finds any filed information in seconds. Computes totals, subtotals, commissions, etc. Prints form letters and mailing labels. Gives you quick reports from all or part of a file with a few keystrokes. Or if you need a special report for your bank or board of directors, just "paint" the format on your screen, then have Friday! do all the work.

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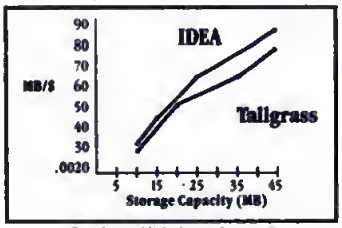

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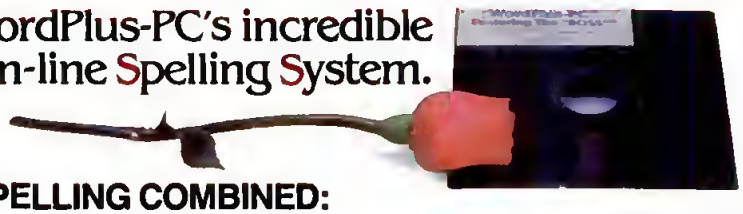
An Industry First in Word Processing Software:

WordPlus-PC™ featuring the BOSS™. Word processing so smart it can even spell 100,000* words.

Meet the BOSS. WordPlus-PC's incredible new Built-in On-line Spelling System.



WORD PROCESSING AND SPELLING COMBINED:

WordPlus-PC featuring the "BOSS" is a whole new technology in word processing software. Finally, the most powerful word processing capabilities have been combined with a built-in electronic spelling system which not only *checks your spelling* but also *corrects your spelling.*

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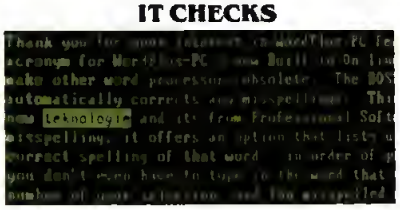
You can also print bar graphs and other charts,** easily move columns, scroll horizontally, execute global search and replace, boilerplate text, and even print proportionally spaced on selected printers. And WordPlus-PC is compatible with virtually all popular letter-quality and dot matrix printers.

*With 90,000+ word standard dictionary and ability for a user to add over 10,000 "custom" words.

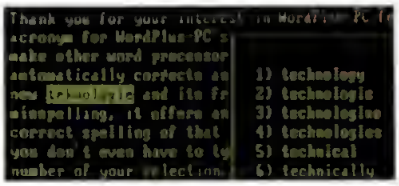
HERE'S HOW THE BOSS WORKS FOR YOU:

IT CHECKS



At the touch of a button, virtually anytime during typing or after the creation of a document, The "BOSS" locates and *highlights misspelled words* on your screen. The "BOSS" can even check the spelling of a word directly after it's been typed in.

IT SUGGESTS



When a word is misspelled, the user can ask The "BOSS" for suggestions as to how to correctly spell the word. With only one keystroke, The "BOSS" will display, in a dynamic on-screen window, up to eight *spelling suggestions in the order of probable phonetic correctness.*

IT CORRECTS

And The "BOSS" *Auto Correct* feature enables users to "fix" these misspelled words directly in text with a single keystroke. The "BOSS" is a total spelling system that Checks, Suggests, and Corrects your Spelling. All built-in.

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WordPlus-PC was designed and written by Andres Escallon
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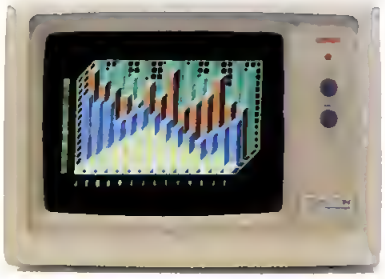
HX-12. A high resolution monitor at a medium resolution price.



HX-12 is a high resolution RGB color monitor that's colorful enough for all your graphics needs and sharp enough for word processing.

With its own cable that plugs directly into the IBM PC, the HX-12 delivers a rainbow of 16 colors on a non-glare screen. All that includes clean whites without red bleed. In fact, all the colors are clean and crisp thanks to the HX-12's .31mm dot pitch and 690 x 240 (non-interlaced) resolution.

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The SR-12 delivers even better resolution color for a better-than-ever price.

At first glance, the SR-12 might appear similar to the HX-12 with a non-glare screen and .31mm dot pitch supporting 690 horizontal resolution. But take a closer look. SR-12's scan frequency is 31.5 KHz, allowing the SR-12 to support 480 vertical resolution in non-interlaced mode. That means a high-quality, flickerless image with text that's up to monochrome standards. What's more, you get all that quality for **$799.**

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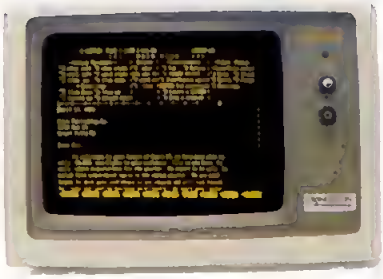

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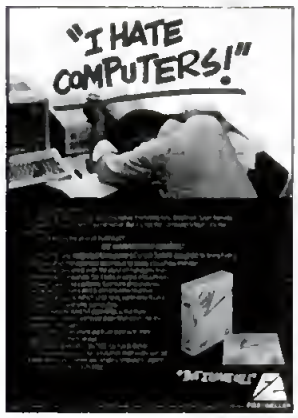

These ads for OZ have appeared in major computer magazines including Infoworld, Byte, PC Magazine, PC Week, Computer Retail News, Computer Merchandising, and Micro Market World.

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IBM Personal Computer Trends and Developments

IH News

FROM THE EDITORS OF PC

SEPTEMBER 4, 1984

NCC: Where's the Story?

Even PC-related vendors resort to me-too products and marketing hype at show

BY BILL MACHRONE

LAS VEGAS—Perhaps it will go down in the annals of history as The Show Where Nothing Big Happened.

It was a sad state of affairs at the National Computer Conference (NCC), at least for news-hungry journalists.

Take compatibles. Almost since their inception, the compatibles manufacturers have taken an uneasy "us vs. IBM" stance. Columbia, firmly ensconced in third place with solid, workmanlike machines, has no hope of overtaking runaway Compaq. So what does Columbia do at NCC?

Throws rocks at Compaq's just-announced Deskpro in a head-to-head comparison with its Professional.

Compaq had been playing it cagey about the source of the Deskpro's tape drive for two reasons. First, it didn't want to have to compete with other compatible manufacturers for this single-sourced product. Also, Compaq wanted a sufficient lead time during which its machine would be the only one so equipped. To further its cause, the company implied to the press that the unnamed manufacturer was building the drive with proprietary, Compaq-developed technology.

Meanwhile, the drive man-

(continued)

Compatibles Seek Niches With Price, Speed, Savvy

New machines from Tava, ACT, and Polo court customers in the crowded compatible market

BY CONNIE WINKLER

NEW YORK—The craziness continues.

While some segments of the IBM PC and compatible market are falling down, and others are reconsidering the future of MS-DOS anyway, yet others are still in the compatible frenzy.

- Tava Corporation, which already offered a bargain-basement PC, now has a $2,495 Turbo Tava that runs at 8 MHz (or at the standard PC's 4.77 MHz). The Turbo Tava is based on the Intel 8088-2 chip and has a hard disk expansion slot. And, the original Tava PC price has been cut further to $1,955.
- ACT, the British PC leader, is taking two swings at the United States market with its Portable (built-in 80-by-25 line LCD screen, Sony 3½-inch drives) with voice input and its $1,595, compact desktop F1 with a cordless, infrared trackball mouse (no need for a clear desk), up to 720K RAM, color graphics, and bundled software.
- Polo Microsystems is moving ahead nicely (thank you) with a Hong Kong-manufactured $3,995 everything-you-always-wanted PC and software bundle for businesses requiring fewer than five PCs. The Polo is aimed at vertical markets such as florists, veterinarians, and cemetery managers.

Certainly none of these three companies will perturb IBM, the newly ambitious AT&T, or even Compaq Computer, which are gathering steam in the Fortune 5000 market. Each, however, has found an interesting

(continued)

ACT includes infra-red keyboard and 3½-inch disk technologies in its Apricot F1 (left) and Portable (right).

Compatible Niches *(continued)*

niche: ACT continues to rub out IBM in Europe, Tava still wins on price, and Polo is making interesting plays in small still-to-be-penetrated niche markets.

Tava Tactics

Tava has been selling 500 PCs a week with its $2,395 model that has oow been cut to $1,995. That sales number will jump to 1,000 when the Turbo Tava is available after August, said Tava president Perry Lambda. Business users, especially, will want the 8 MHz speed offered on the

Turbo, he believes, although the machine doesn't come with a hard disk. (A hard disk version is expected later this summer.)

The 1½-year old Tava—which is committed to undercutting the price of IBM's PC and others while still remaining compatible—is also planning machines based on the new Intel 80186 and 80286 microprocessors, Lambda said.

Based on the Intel 8088-2, the Turbo Tava comes standard with: five expansion slots, 64K expandable to 256K on the motherboard and a system total of 640K ($60 for each additional 64K of internal memory), parallel printer port, RS-232 port, two 360K disk drives, and a monochrome monitor and controller.

There's also room in the Turbo package for a 10- to 30-megabyte hard disk and an XT compatible power supply. The Turbo will go to dealers in August, Lambda said.

The Tava-PC now has 64K memory (versus 128K in an earlier edition), two 360K floppies, controller, monochrome or color adapter, and green or amber sereen monitor.

Immediately after IBM's June PC price cuts (in the neighborhood of 23 percent), Tava experienced a slowdown in sales, but a spokeswoman attributed that to an "emotional sort of reaction," which has subsided.

ACT into U.S.

Going into production in August (in the U.K.), the ACT Apricot Portable weighs in at 13 pounds and has a detachable keyboard capable of remote, infrared operation, like the PC*jr*.

The weirdly shaped system unit, with a voice input microphone on one side, has a tilted LCD screen and 3½-inch drives on the side of the lower unit.

At $2,695—with 256K RAM and a lone 720K Sony double-sided disk drive—the Portable is intended for out-of-the office use, at home or traveling, said Peter Davies, president of ACT (North America) Inc. For the office, ACT recommends a color monitor and the cordless mouse for about $500 more.

Although voice input was not operating on the prototype shown at *PC Magazine* offices recently, ACT promises the machine will accept 64 single-word voice commands.

Both the ACT Portable and F1 are based on the Intel 8086 (at 5 MHz, about 30 percent faster than the IBM PC); they come with built-in word processing, calendar, and *SuperCalc* spreadsheet software. These computers will run most MS-DOS programs, ACT said, despite their use of smaller disks.

The bargain-priced F1 is aimed at the education market and supports 640-by-256 pixel graphics. Its infrared, two-button trackerball mouse is optional. Users rotate the ball directly to produce the same effects as moving a mouse cursor controller (such as Microsoft's) around on a desktop. A fiber optic "light pipe" (similar to the one available for the detachable keyboard) is available for use in busy environments.

ACT products are being distributed here through Micro D distributors and their 300 dealers, said Davies.

Polo's Game

"It depends on where you're starting from," comments Robert J. Sherwood, on recent slowdowns in PC sales and the survival woes of compatible-makers. "If you're used to 40 percent growth rates, then today it's slower." Sherwood docsn't have that problem because he's starting from zero. "From where we are, if there's a softening in the market, we don't see it," said the vice president of marketing for the Mountain View, California-based Polo.

Polo's secret is that it is truly an all-in-one, prepackaged system for the user who wants fewer than five computers and no hassles. This isn't the market AT&T and IBM are courting, quips Sherwood.

Polo comes with a built-in 300-baud modem, 120 cps correspondence-quality printer, color monitor, detachable keyboard, and, of course, the standard 128K memory, dual floppies, and all the necessary cables. The full software bundle is special in that it includes *Crosstalk* for communications, as well as *SuperWriter*, *SuperCalc 3*, *PFS:File* and *PFS:Report*, and *Finance Manager*.

Polo is marketed by value-added retailers (VARs): retailers who do more than 50 percent of their business through outside sales staffs that are willing to call on a company that needs no more than five PCs, Sherwood explained.

Polo's hardware is manufactured in Hong Kong by the Radofin company, then warehoused in Sunnyvale, Calif. ■

Will MS-DOS Follow CP/M Into Oblivion?

LAS VEGAS—How long will the "PC standard"—the popular designation for an MS-DOS operating system running on an Intel 8088 processor—survive?

Experts at the National Computer Conference (NCC) here recently suggested MS-DOS may well follow the way of CP/M, which on many machines is now obsolete. What system might dominate next?

- Esther Dyson, president of EDventures: "IBM thinks it owns PC-DOS, but it docsn't. There's going to be a huge market out there for PC-DOS hardware and software, no matter what IBM does."

The New York publisher of the *RELease 1.0* micro software newsletter acknowledged that IBM in its DOS hasn't addressed icons for user interfaces or "appreciated the advantages of a nonintimidating user interface or the importance of integrating graphics within text."

- Aaron Goldberg, director of microcomputer services for International Data Corp. in Framingham, Massachusetts: "The 8088 is not the way to get things done. Too many programs are slow to load, and it's not capable of multitasking." Predicts Goldberg: "At least 10 to 12 compatible manufacturers will die."
- John F. Akers, IBM president, also tiptoed around the issue of alternative operating systems. Asked if IBM would adopt UNIX on its next generation of microcomputers, Akers responded (as he has on other occasions), "if a particular operating system appears to have the support of most of the marketplace, then we would seriously consider offering that product to our customers." ■

NCC *(continued)*

ufacturer, Irwin Magnetics, has been showing the drive to OEMs, lining up orders for as much business as possible.

Compaq's reaction was outrage. It quickly claimed that it had already committed to buy Irwin's full output for the forseeable future and that no one else was going to get any of the

TeleVideo moves towards PC networks with its Personal Mini file server.

tape drives. Columbia counterclaimed that in October it will be shipping the drives in quantity as part of the Columbia.

Ironically, Columbia's ad conveniently overlooks one point in its point-by-point comparison with Deskpro: The Deskpro is two to three times faster than the Professional. Deceitful? No, just marketing.

AT&T Anticipation

Just prior to the show, a rumor cropped up that MS-DOS would not be the primary operating system for AT&T's new PC 6300. Instead, Concurrent PC-DOS, by Digital Research Inc., would be the standard. On the second day of the show, AT&T Information Systems and Digital Research (DRI) scheduled a joint press announcement. Everyone was poised for a potentially strong statement about the direction of operating systems on personal computers.

Instead, they got assurances. Yes, DRI's Concurrent PC-DOS would be offered on the PC 6300, but so would Microsoft's MS-DOS. No one would be specific about anything. Officials at AT&T said that Concurrent PC-DOS was conceptually a lot closer to UNIX than MS-DOS, a natural preference for its existing UNIX customers. Asked if Concurrent PC-DOS was a hedge against IBM's anticipated windowing product going under the name Glass, an AT&T press representatives responded, "What if Crystal [DRI's windowing product] *is* Glass? Reflect on that."

Cute. The last thing we need now is for the world's largest company to play cute.

TeleVideo Mini

Meanwhile, TeleVideo Systems announced that its Personal Mini (PM) network server was ready for shipment. The product, which was previewed at Spring COMDEX, provides low-cost file sharing and networking for PCs and compatibles, including TeleVideo's diskless PM Workstation. The adapter card for PCs is only $99, instead of the typical $600 for a network card.

TeleVideo calls the operating system InfoShare. The networking software is actually Novell's highly regarded *Netware*, which pemits file sharing, multiple access, and record locking.

Tecmar thinks big with its 74-megabyte drive and 45 megabyte tape back-up.

Inside the diminutive box, file operations and MS-DOS emulation are handled by an 80186 running at 8 MHz. Each PC channel is managed by a Z-80 microprocessor over a high-speed, twisted-pair cable. A 46-megabyte drive provides storage for up to 16 users. Back-up is via a built-in 700K floppy or optional tape; 256K of standard memory can be expanded to 512K for better performance with a larger numbers of users.

The PM/16 drives both serial and parallel printers, allowing users to share expensive resources such as high-speed or letter-quality printers. The PM/16 is $8,995, including the InfoShare operating system.

Tecmar's Big Drive

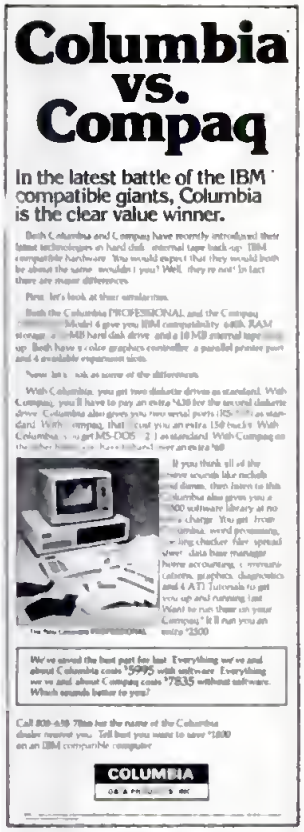
Tecmar also had a quiet contribution to the networking scene, in the form of its new Massfile storage unit. The unit is the first to feature a truly high-performance 5¼-inch hard disk, manufactured by PRIAM Corporation. The 74-megabyte drive is backed up by a 45-megabyte tape unit.

The Massfile attaches to any PC via a standard Tecmar hard disk controller card. While a single user could use the system, its more likely application will be as an add-on to a PC working as a file server on a network. The PRIAM drive features average access times less than half those of hard disks typically used on PCs. The increase in performance is obvious, even to a casual observer. A virtually identical version of the product was announced simultaneously for the Apple Lisa, a machine that sorely needs high-performance disk I/O.

Also shown at the Tecmar booth was *PC Paintbrush*, a Macintosh-like color screen-painting program to be offered free with Tecmar's Graphics Master board.

Trial software packages were everywhere at NCC. Transend Corporation broke all previous price barriers by offering a trial version of its *PC Com-plete!* package for only 99 cents. Unlike other trial packages that leave out some vital function, this one has them all. However, it counts the number of times that you use it and quits after 15. Transend sweetens the deal for retailers with a point-of-purchase display and even rental modems if the prospective customer doesn't have one. *PC Com-plete!* offers a comprehensive list of features, including unattended electronic mail and effective screens that simulate in and out baskets.

The realities of the marketplace have also caused some attractive pairings of large and small companies. One of the nicest is AT&T Information Systems' association with Relational Data Systems (RDS),



Columbia is taking on competitors besides IBM in its latest ads

which produces *informix*, a highly regarded database manager for UNIX and MS-DOS. It also has a lower-function version of the product, called *File-it!*, again available for UNIX and MS-DOS. *File-it!* lacks some of the features of *informix*, but it has screen-painting, menus, and context-sensitive help screens to aid the non-technical user. ATTIS recognizes that software sells hardware and has selected RDS products as standards for both the 3B2 minicomputer and the PC 6300. "Bridge" software such as this, which spans operating systems, will ensure the acceptance of both machines.

Another communications bridge product—from Apple's Macintosh to the IBM PC—was announced by dilithium Press of Beaverton, Oregon. The $99 *PC to Moc ond Bock* product has two disks, a 5¼-inch for the PC and a 3½-inch for the Macintosh, and works with modems on either system so that users can tap on-line networks, dilithium Press said. ■

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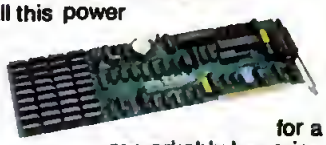

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*Cables available separately

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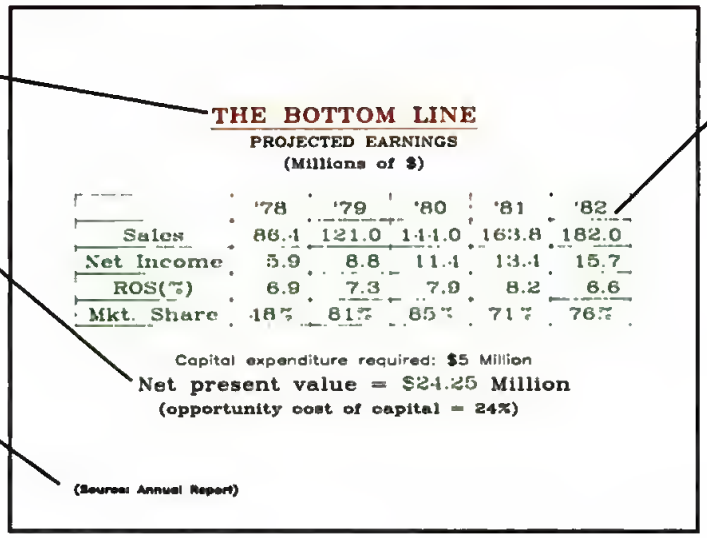

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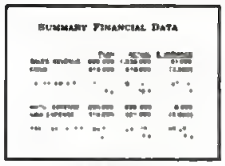

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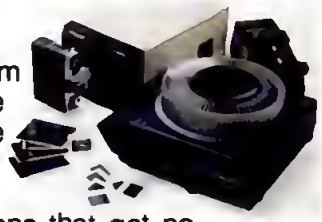

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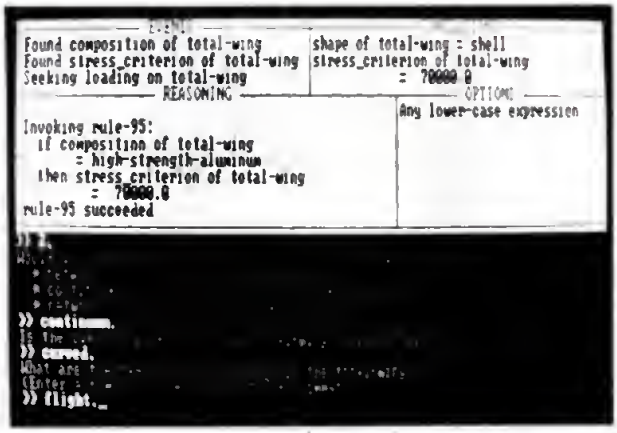
Artificial Intelligence Comes of Age on PC

Teknowledge, Inc., with $12,000 M.1 offers a PC-based 'instrument panel' for developing knowledge-based applications

BY ROBIN WEBSTER

PALO ALTO—What wine should I have with herbed chicken livers? Is my current portfolio working in the best way for my capital? At what point will the building I just designed fall over?

Such questions are generally handled by wine, financial investment, and structural engineering experts—of the human kind. Now with an "expert system" package called M.1, IBM PC users can now explore the possibilities of using their machines to deal with these and other more sophisticated problems.



Intelligence Now?

The introduction of M.1 does not mean that expert systems for microcomputers have "arrived." Its hefty $12,000 price tag (including a 4-day training course) puts the package beyond the range of most individual IBM PC owners. It will, therefore, be mainly of interest to corporations with enough problems to make such a purchase worthwhile. Even then, M.1 is still only a prototyping system—it cannot be used to create full-blown knowledge-based systems.

M.1 was developed by the Palo Alto-based Teknowledge company, a spinoff of Stanford University that employs many leading artificial intelligence (AI) experts.

What Is AI?

A knowledge-based system is comprised of two parts: a collection of facts and rules about a specific area of expertise (the *knowledge base*), and a logic system that uses those facts and rules to make inferences based on user input (the *inference engine*). Additionally, well-designed knowledge systems allow the user to interrogate the knowledge base to discover how certain conclusions were made.

Not long ago, knowledge-based systems existed only on mainframe and larger minicomputers, or on custom machines that were optimized to run huge LISP programs at phenomenal speeds. Developing and operating such sophisticated systems typically cost somewhere in the six-figure range, and they were usually dedicated to solving problems in a single domain (diagnosing meningitis or prospecting for particular metallic ores, for example).

Although its price tag might suggest the need for a large amount of main memory, the M.1 system can operate in only 128K of RAM. It was written mainly in the PROLOG (PROgramming in LOGic) language. Any knowledge system developed with M.1 can access up to 200 knowledge-based rules at one time.

```
if a substructure of the house = X1
   and the composition of X1 = cast-iron
      or the composition of X1 = concrete
   and a stress on X1 = X2
   and X2>50
then a risk to the house = cracking cf 60
```

Figure 1: A knowledge rule taken from the SACON structural engineering system, a compact version of which is supplied with M.1.

How It Works

A knowledge rule might take the form of an IF-THEN statement, as shown in Figure 1. Notice that variables are allowed, and that the "risk" involved in a situation is given a certainty factor (cf) rating. The cf feature is an important mechanism for encoding judgments, or even hunches, about how a particular problem should be tackled in a machine-acceptable form.

Most of the rules are examples of common sense: if it is raining outside, then there is a very high probability you will get wet if you go for a walk; if you take an umbrella with you, the likelihood of getting wet diminishes.

One such set of rules is SACON (short for Structural Analysis Consultant), a structural engineering expert system developed at Stanford on large computers.

In addition to dealing with expressions couched in an English-like manner (as in the SACON example), M.1 can handle mathematical expressions such as (132 * 100)/12 or Integral (2 * x/(log(x) − 1)).

Q and A Sessions

M.1 has almost no user interface to speak of since it merely plays out consultation sessions in question-and-answer form. The system asks the necessary questions and the user responds as accurately as possible. Questions are displayed in dark blue (if you have a color system) and answers appear in light blue. This color choice, in common with all other user interface arrangements, cannot be changed.

A new idea that M.1 has brought to knowledge-system development on microcomputers is that of the "instrument panel." This panel is used by the knowledge system builder to test and debug an application. Data, including the current rule or expression being evaluated and the current knowledge-base rule being invoked, is displayed within the panel. This allows the designer to spot flaws in the reasoning method of an application while it is actually functioning.

Although M.1 is Teknowledge's first commercial test of the "knowledge system on a micro" concept, the company already plans to introduce more developed knowledge-based products in the near future. One product, T.1, is intended as an educational tool. Another will be a full-fledged expert system builder package based on M.1.

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On the Road with IBM: Vive la Différence à l'Expo

BY STEPHEN MANES

PARIS—In the shadow of the Eiffel Tower's technological wizardry, the Trocadero Gardens of Paris get one star from *Guide Michelin* for their surging fountains and broad-leaved trees. What better place to launch an exhibit with the theme of applying technology to the facts of nature?

Voilà! Under the spreading chestnut trees appears a bright, airy, plexiglass-and-wood quonset hut designed by Renzo Piano, a chief architect of Paris's controversial Pompidou Center. Inside is *l'Expo*, an IBM Corp. exhibit that will travel to 20 cities in 14 European countries over the next 3 years. Aimed at 15- to 24-year olds, the show struts IBM's stuff with a strong emphasis on applications.

"At *l'Expo*, the personal computer is king," declares one of the exhibit's lavish brochures. PCs and XTs (plus one lone Junior) are strewn about the hall, where they play interactive games, decipher voice commands, serve as videotex terminals, and generally do the things they do with great aplomb. But to those who've seen all that before, the real royalty of the show is its hands-on glimpse into the past and future of computers.

One exhibit takes a look at the development of a chip (called a *puce*, the French word for "flea" or "tiddlywink") from raw silicon to integrated circuit. Visitors are allowed to peer through a microscope at IBM's first mass-produced 64K memory chip, dating from the "historic" days of 1978. Also on display are the high-density, water-cooled panels that go into IBM's top-of-the-line mainframes, plus Model 3380 disk drives with on-line storage of 2.5 gigabytes and access to 3 megabytes per second.

Super Screens

Model 3290 gas plasma screens, with their peculiar hi-resolution orange glow, which IBM has been quietly unveiling over the last several years, are almost as plentiful as PCs at *l'Expo*. Even more stunning are the highly realistic, 256-color floral images displayed on the Model 5080. And a Model 7350's demonstration of image enhancement lets you zoom in close on an aerial view of Paris.

Demonstrations of voice input include a particularly impressive experimental program designed to "visualize" sound and help deaf children learn to speak more clearly. Various graphics tablets let visitors modify images and add captions to droll cartoons. Touch screens and icons have appeared in U.S. exhibits, but if IBM Europe has secret plans to join the Xerox Star and Apple Mac/Lisa bandwagon, it keeps them well hidden at *l'Expo*: not a single mouse is in evidence.

Esoteric hardware, on the other hand, is all over the place. The Model 4250 photocompositor is there, setting reproduction-quality type and illustrations on aluminized paper. A Model 7535 industrial robot grasps U.S. Olympic coins and slugs in its spidery fingers and, under the guidance of a PC, puts them through a series of tests to distinguish the genuine from the fake.

Lasers get their due in the form of glass-slicing tools and holographic supermarket scanners. And a film from Big Blue's Zurich labs puts you closer than ever to the submolecular world with the help of a computer-enhanced "tunnel effect" microscope that is able to take three-dimensional views with a vertical resolution of approximately *one atom*—almost 500 times better than previous limits.

Though *l'Expo* is hardware heaven, the show brochures are also notable, especially in contrast to IBM's dry U.S. brochures. One brochure, attempting to show how reality can be represented by a network of relationships among facts, uses such disparate concepts and personalities as infinity, death, Yuri Gagarin, Phaëthon, and Teotihuácan to come up with a working definition of the sun.

In the master brochure, along with results of a poll of European youth (significantly more are interested in sports, arts, and leisure than in science), is the most surprising image of the whole show: a photo of Elvis Presley juxtaposed with album covers of the Beatles' *Rubber Soul* and the *Nina Hagen Band* illustrating an article, "Music and the Young: 25 Years of Rage, Myths, Fashions."

What's remarkable about this piece is that it must be the first official IBM document that recognizes the existence of Frank Zappa, Lou Reed, the Velvet Underground, the Clash, and—may God save the Queen—the Sex Pistols. So the most important question about technology and nature that *l'Expo* raises may well be this: Will the PC*jr* be marketed overseas as a punk computer? ■

Western Union's EasyLink Taps Into Tymnet

UPPER SADDLE RIVER, N.J.—Western Union's EasyLink electronic mail service is now only a local call away in more than 450 cities, thanks to Tymnet.

When the EasyLink service was first offered, there were 16 "Metropolitan Area Connect Numbers," which were part of Western Union's own packet-switching network; subscribers outside of these areas used a toll-free number.

While the announcement to subscribers didn't mention Tymnet by name, Western Union now uses this national packet-switching network to provide additional access to EasyLink. The changes come after the U.S. Postal Service has cut back its electronic mail service.

Give and Take

Perhaps the best news is that there is no additional charge for using these local numbers. As before, Western Union charges only for sending messages, not for receiving them. The charges are based on time, and vary depending on the baud rate used, with discounts for off-peak and volume usage.

The "give" in the announcement is tempered with a little "take," however. One of the company's reasons for adding the Tymnet connections was the high cost of the toll-free service, according to a Western Union spokesperson. As a result, it has added a 15-cents-per-minute surcharge for connection to the toll-free number, effective in August. Also, any EasyLink message that has been left in a subscriber's "mailbox" more than 10 days will be delivered as a Mailgram Message, with a 50-cent charge to the recipient. This guarantees any message sent will eventually be delivered, even if recipients forget to check their EasyLink mailboxes.

Nearly half of the 60,000 EasyLink subscribers use microcomputers to hook in, and the percentage is growing rapidly.

Western Union also has aggressive plans to release a microcomputer communications program to simplify creating your messages off-line and to completely control dialing EasyLink, signing on, sending the message, and signing off. The program, due late this summer, also accesses other on-line services, and is expected to be just the first of many new products and features scheduled for the next 6 months, Western Union said. ■

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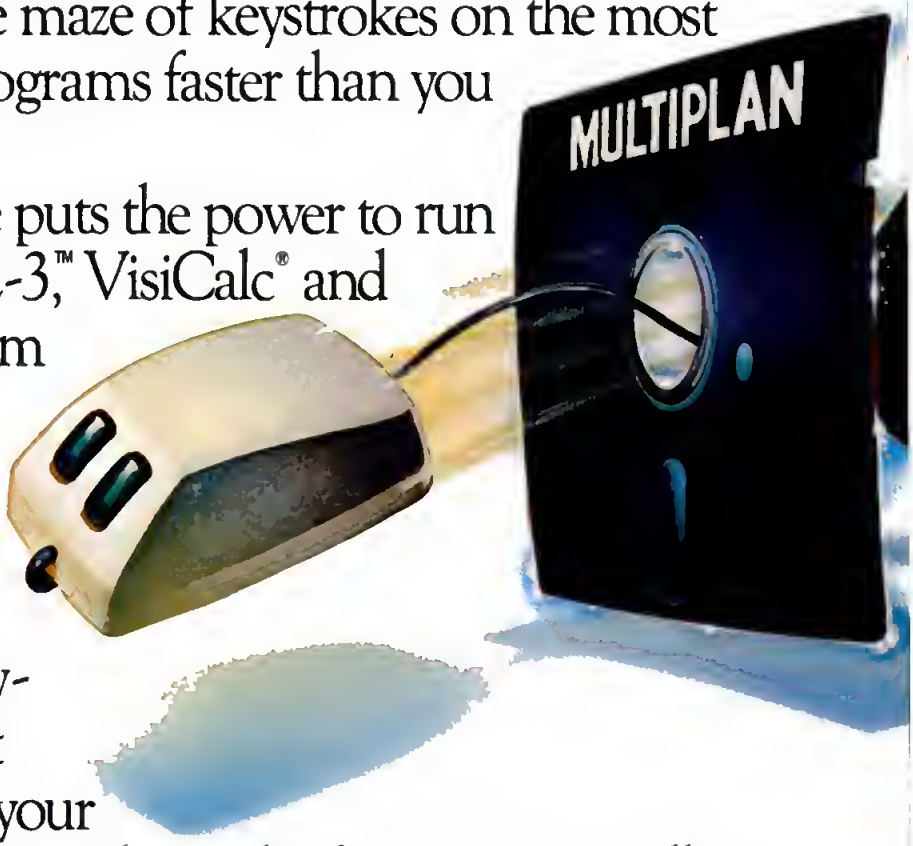

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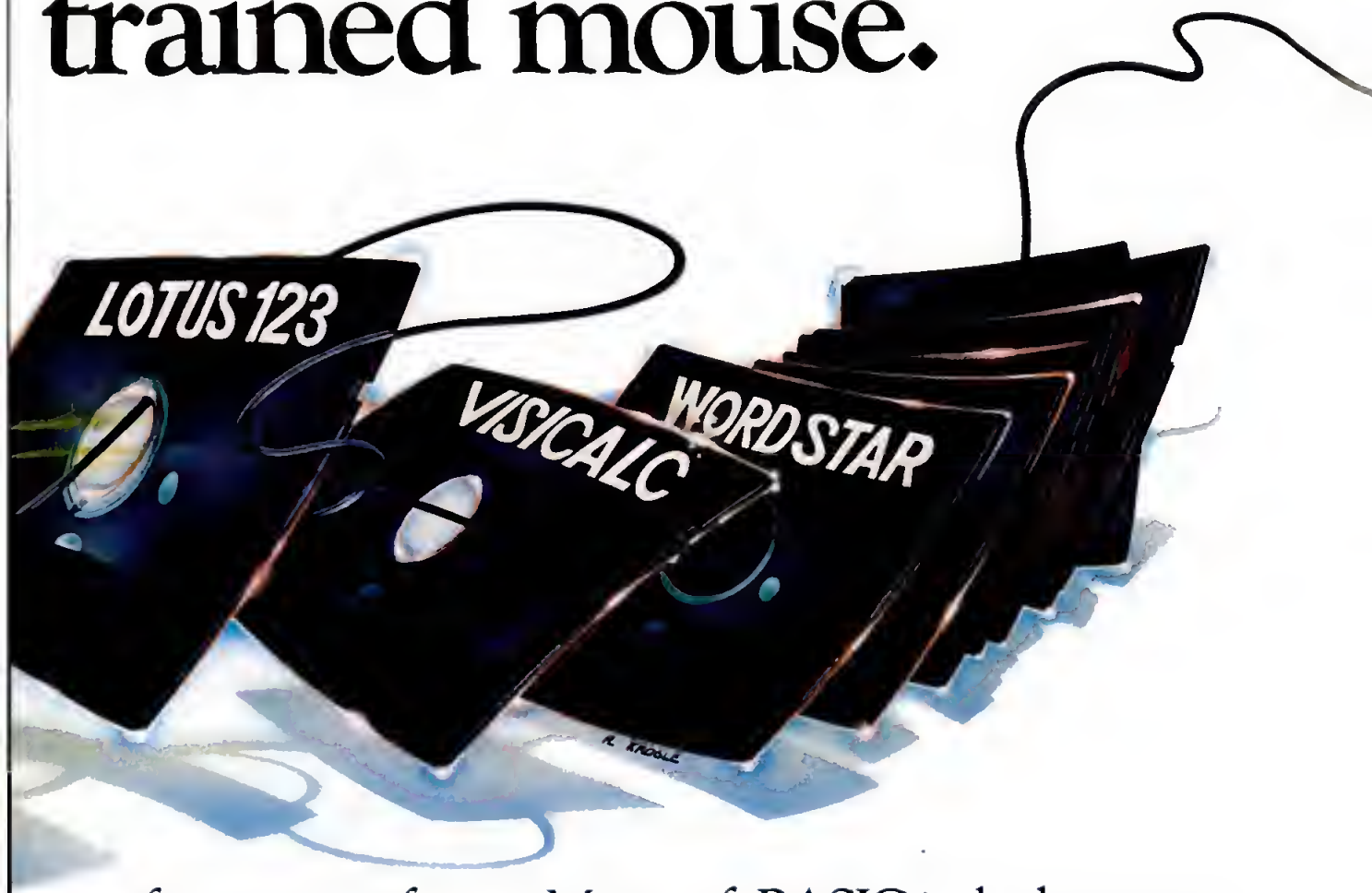

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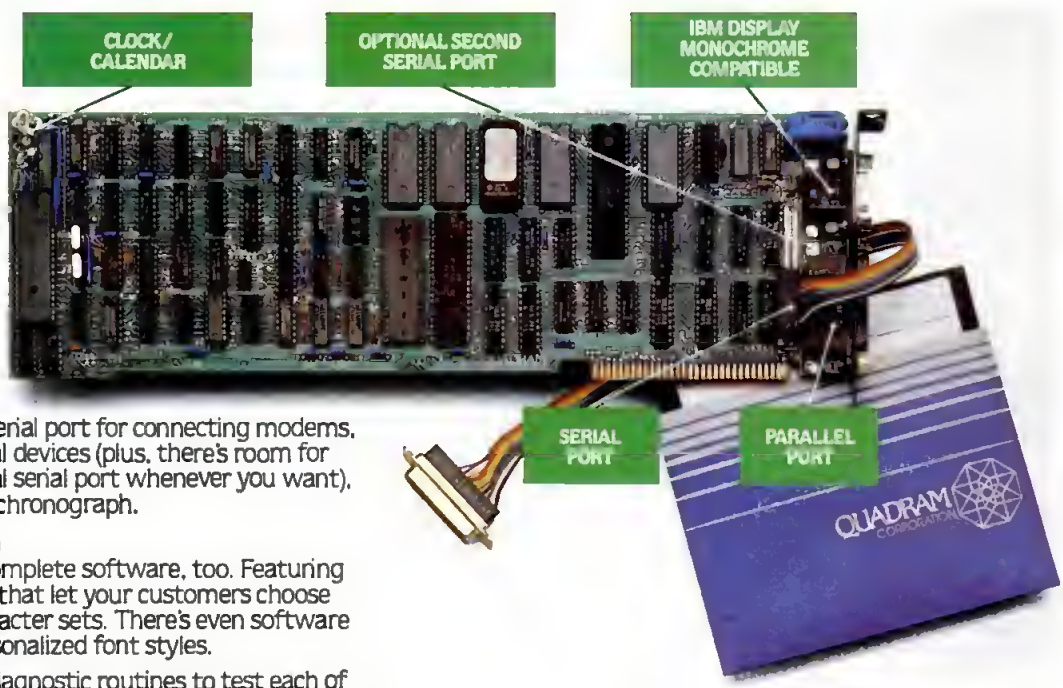

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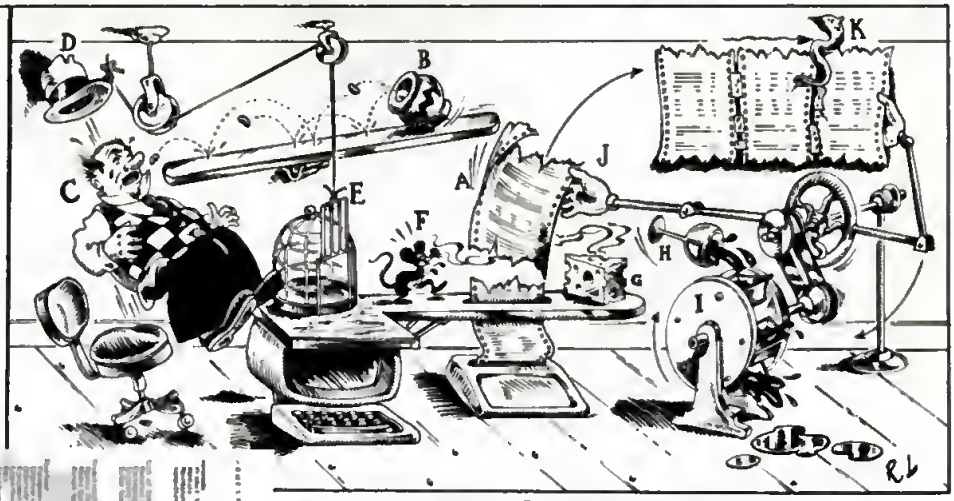

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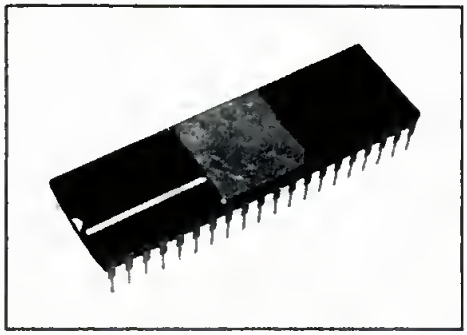

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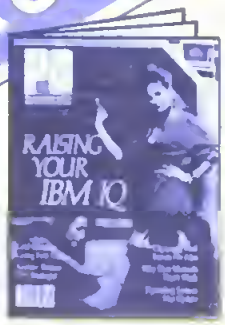

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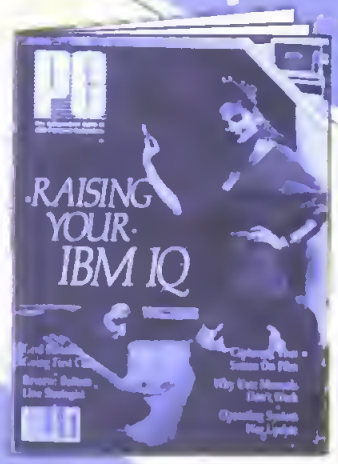

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Relax: Help Is on Way for Stressful You and Your PC

NEW YORK—For many users, computers cause increased levels of stress. Now Synapse Software of Richmond, Calif., has introduced a new hardware/software combination for the IBM PC, called *Relax*, that combines biofeedback, autogenic training, and progressive relaxation techniques pronounced to help understand and reduce stress.

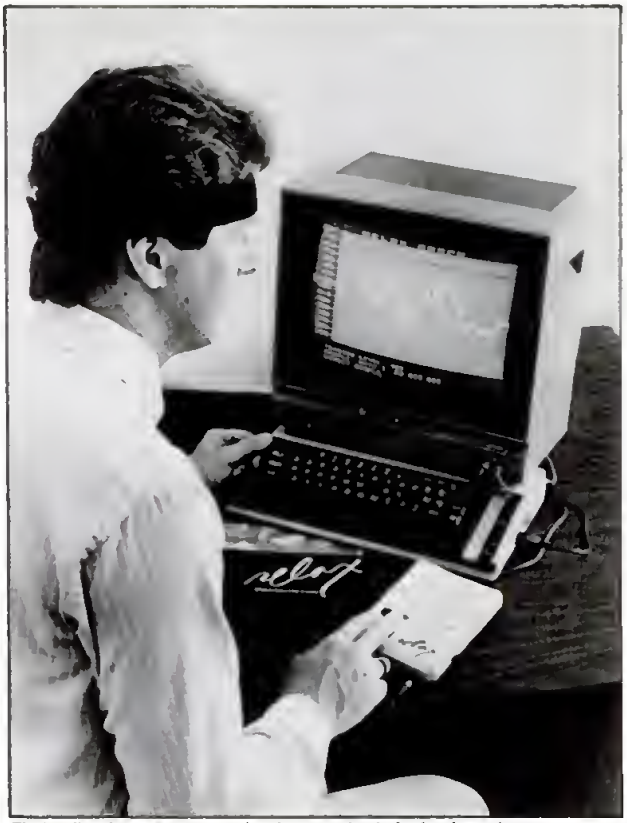
One of the keys to avoiding the harmful effects of stress, which affects almost everyone today in one way or another, says popular psychiatrist Dr. Joyce Brothers, is to learn to control and use it, rather than letting it control you.

Sensing Tension

Relax, unveiled here recently, lets you do just that, boasts Synapse, which sells software for the home. The system uses an electromyograph (EMG) to sense muscle tension in the forehead, generally accepted by scientists as an indicator of overall stress levels. The package then converts this reading into different kinds of visual displays—graphically showing the user how much stress is being experienced.

The displays include a clinical-appearing, continuously scrolling graph; a kaleidoscope pattern that varies color and complexity according to the tension level recorded; and a videogame that lets you "use your mind as a joystick," which rewards control of your stress level (making it rise and fall) with higher point scores.

Besides merely lowering stress while using the system, Ihor Wolosenko and Kenneth Grant, Synapse's founders, and Dr. Martha Davis, project manager for *Relax*, believe that the system's real usefulness lies in helping people practice techniques they can use to control stress when it occurs. Training with *Relax*, they claim, teaches users personal methods of relaxation applicable to many situations. The system can be used to identify some of the causes of stress affecting an individual, they suggest. Imagining possibly stressful situations and then watching the visual feedback provided by *Relax* can give an accurate measure of the degree of stress a person associates with that particular problem or situation.



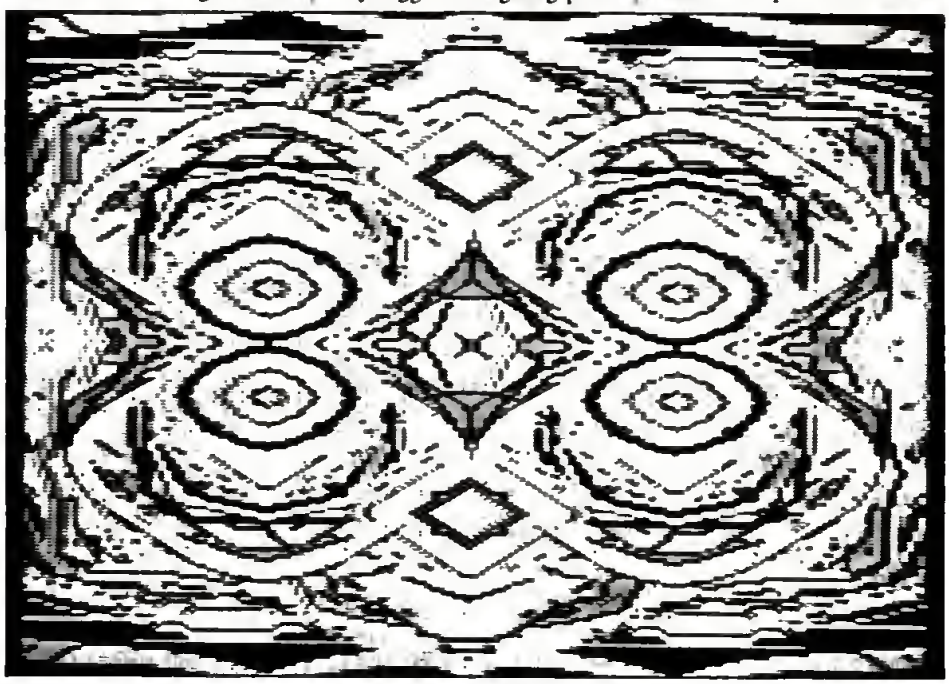
The headband contains sensors that detect tension in forehead muscles. Relax *displays these readings in a graph on screen*

Synapse sees *Relax* opening up an entire new genre of computer software: not business related, but not a game either. They hope to release other personal development software that fits this mold.

Strap on the Band

The *Relax* package consists of a headband holding the three EMG sensors; a control unit that can vary the sampling rate from slow (to give a reading of overall stress) to very fast (to provide information on specific stress reactions); a deep-relaxation audio tape; and a workbook of the system's documentation and guidance on managing stress, including instructions on how to create a personal stress management profile and stress reduction plan.

Relax is available for the PC and PC*jr;* it retails for $139.95. More information can be obtained from Synapse Software, at 5221 Central Ave., Richmond, CA 98404, (415) 527-7751. *—Frederic Paul*



Relax *generates a kaleidoscopic pattern that mirrors your tension level.*

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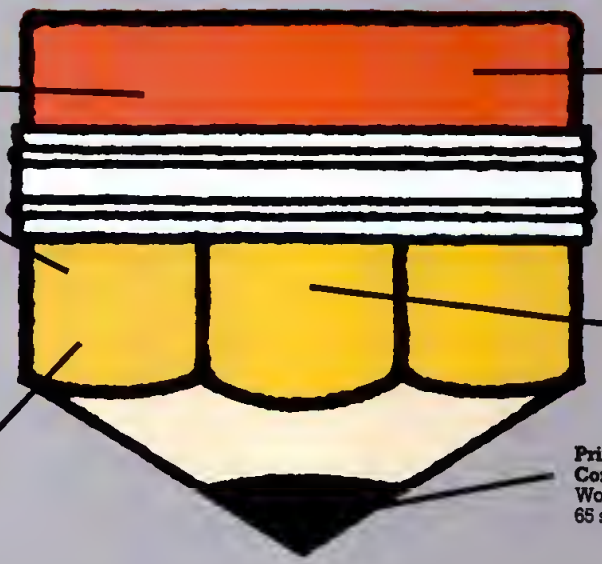

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CIRCLE 268 ON READER SERVICE CARD

Memories Are Made of This

Remember those summers when everyone piled into the old Winnebago and drove into the scenic heartland of America. When we got there, after several mind-softening days on the road, we liked nothing better than to head into a gift shop and pick up postcards and various silly souvenirs, gifts, and gewgaws. Things we'd be too embarrassed to buy close to home, but—let's admit it—we're only too glad to have an excuse to acquire.

Now summer's come again, but last winter we sold the Winnebago to buy a 20-megabyte hard disk and a 4-color plotter. Since then we've stuck close to our homes and PCs, but our secret desire for knicknacks is burning on unsatisfied.

Take heart! Two mail order companies are ready to fix you up with precious *chatchkas* that look like prizes for games at a PC theme park.

Harriet Carter's 110-page catalog is a traditional source of gifts for friends and relatives who fancy cats and dogs, gardens, thimbles, trains, fly fishing, and leprechauns. In this year's catalog, Carter offers about a dozen computer-related items alongside her chocolate-scented memopad, the ceramic English bulldog that plays "Chariots of Fire," the maternity mug (don't ask), and the plastic penguin lawn ornament.

What are the PC counterparts to these tacky tidbits? A 2-inch-wide wind-up computer and another tiny PC with an LCD digital clock for its screen. A memopad made of greenbar printout paper. T-shirts with official computer excuses or the message, "Real men don't have floppy disks." Mens briefs with "Personal Software" printed across the backsides (these are packaged in a box that resembles the IBM PC's keyboard). A mug saying "Old computer people never die—they just lose their memory" is across the page from a cassette tape that improves your memory through hypnotism. And you can grace your workplace with a truly original *objet d'art*: a framed picture of two mice (each sketched around a thumbprint) in a scene with the motto, "Computers...make the world go 'round."

Ordering these items from the Harriet Carter catalog should help satiate your urge to make a shopping expedition to Little America or the Corn Palace. To get on the mailing list, write to Harriet Carter, Dept 14, North Wales, PA 19455.

Superior Gifts

A far more sophisticated selection of computer novelties is offered by Sweet Gum, Inc., of North Miami, Florida. Although its name doesn't even hint of technical specialization, this company is dedicated to computer-specific goods. Consider Sweet Gum's mahogany, oak, and cherry joysticks. Or dressy ties with diskette checks. Computer-art greeting cards and a microchip jigsaw puzzle. Binary clocks and watches, with analog hands that circle the hours from 0001 to 1100.

For the sports minded programmer, "Computer Jock" wristbands and T-shirts are available. For the art enthusiast, swatches of core memory (unstitched by hand from the innards of an IBM 360) are available handsomely framed or embedded in a lucite block.

Sweet Gum is also a source for programmable coffee mugs that display a "Computer Expert On Duty" message when empty, but automatically change to "Off Duty" at break time when you loaded up with hot coffee.

If you want to peruse this tasty catalog, write to Sweet Gum, Inc., 15490 N.W. 7th Ave., North Miami, FL 33169, (800) 237-9338.

—James Langdell

IBM's XTs Make Culture Touching

NEW YORK—Visitors to New York who are searching for information about city attractions have new helpers—specially programmed IBM XTs with touch-sensitive color video screens. Located in the lobby of the IBM Gallery of Science and Art, these NYCulture Guides give tourists computerized access to information about 244 museums, historical sites, zoos, exhibits, and botanical gardens around New York City.

Simply by touching a screen, visitors can call up the information in the guides, which is listed geographically, alphabetically, and by subject matter. For the geographic listing, the touch screen, produces a graphic video map and all a visitor has to do is touch an area on the map to get information about attractions in that particular area of the city.

Another way of accessing information is by using the alphabetical listing. For example, if you were interested in visiting the Musuem of Modern Art (MOMA), you would call for a listing of institutions that begin with the letter *M*. After selecting the MOMA, you would then see a series of graphics and explanations representing different categories of information including specific exhibits, special attractions, museum hours, facilities, and special provisions for children and handicapped.

Information in the guide is updated monthly. There are five

"towers" with two screens on each, enabling one person to use the bottom screen while others can watch the same information displayed on the top screen. They are easy, fun, and free and can be used Tuesdays through Fridays, 11 a.m. to 6 p.m., and Saturdays from 10 a.m. to 5 p.m. IBM's gallery is at Madison Avenue and 56th Street.

—Jane Mintzer

PC/Disk, Microsoft Chart a New Course

NEW YORK—The next issue of *PC/Disk* (formerly *PC Disk Magazine*) will, for the first time, include a demo version of a new business graphics software package—Microsoft's *Chart*.

PC/Disk users can try out this software by first following a printed 15-page guide that explains—keystroke by keystroke—how to do several tasks. Then, users can play freely with *PC/Disk*'s nearly complete version of *Chart* (no saving or printing allowed, however).

The new software demos won't squeeze any real programs off the disk. *PC/Disk* is doubling its size by using double-sided disks, and will offer more original software in each issue than ever before.

To obtain the *PC/Disk* with Microsoft's *Chart* (Volume 1 Number 8), send $35.95 to *PC/Disk*, P.O. Box 5930, Cherry Hill, NJ 08034. (A 3-issue subscription is $84.) ■

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Minis and mainframes have used WordMARC for four years. Now there's WordMARC word processing for your micro.

Originally created for minis and mainframes, WordMARC is now available for use on your micro*. And quite simply, it's the best office-quality word processing software package a micro user could buy. After all, it was the best word processor mainframe and mini users like universities, national laboratories, and Fortune 500 companies could find over the last four years. But, if you need more proof, read on.

☐ *No Problems, No Nonsense, No Competition.* For starters, everything you see on your screen appears exactly as it will be printed on paper. Scientific notation. Foreign language characters. Underlining. Subscripts. Everything. ☐ *A Partial List of Features. That's Right, Partial.* Menu driven w/function keys. Easy self-paced tutorials. Spelling checker. Mail merge. Scientific notation. Foreign language characters. Automatic reformatting. Automatic pagination. Document recovery system. Document encryption. ASCII file handling. And so on. ☐ *If Word Processing's Your Call, Call 800-831-2400.* Granted, just because the call is free is no reason for picking up the phone. You should stop and consider our track record with minis and mainframes. You should stop and think what that can mean for your micro. And you should stop thinking about any other word processing software. OK. Now that you've done that, it's time to pick up the phone.

*WordMARC is compatible with the IBM PC or XT, as well as the Eagle, Compaq, Corona, NCR PC, DEC Rainbow, and TI Professional computers. All versions of WordMARC on micro, mini and mainframe computers are compatible.

MARC Software International, Inc.
260 Sheridan Avenue, Suite 200
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800-831-2400 ☐ In Calif., 800-437-9900

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PRODUCT REVIEW

ZCARD: Just in Time For the Holidays

BY JAMES LANGDELL

ZCARD
ZBANNER
Zazda Software
Omni International, Inc.
P.O. Box 11708
Kansas City, MO 64138
(816) 356-7612
List Price: *ZCARD*, $49.94, *ZBANNER*, $24.95 (both $69.90)
Requires: 64K, DOS, one disk drive, dot matrix printer (*ZCARD* requires graphics printer).

"What can I do with a home computer?" If this question were asked on *Family Feud*, the top five answers would probably be:

1. Play games
2. Help my kids in school
3. Balance my checkbook
4. Store my recipes
5. Keep my Christmas card list

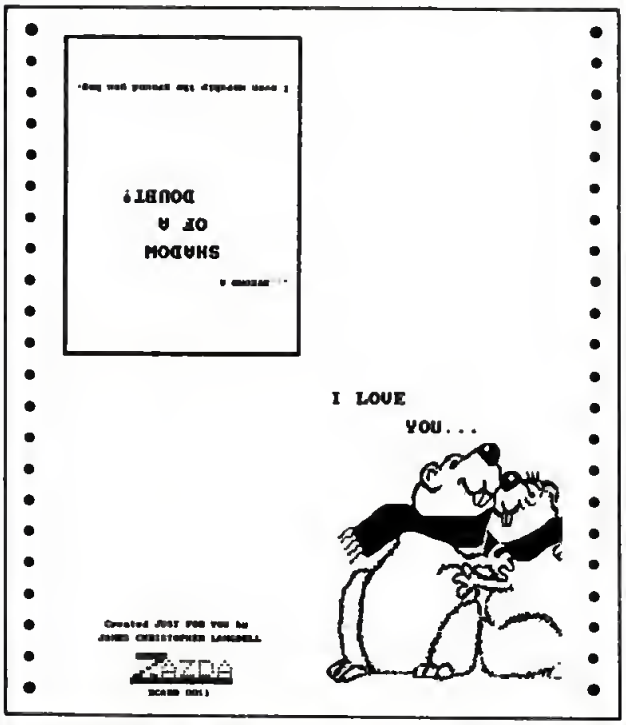
If you've already put the fifth item into practice, you can have even more of a Silicon Christmas by using *ZCARD* and your PC to create the cards themselves. *ZCARD* lets you design customized cards by fitting your own greetings around the illustrations in any of *ZCARD*'s 32 card formats. The *ZCARD* disk provides six different styles of Christmas cards—including three with Santa Claus.

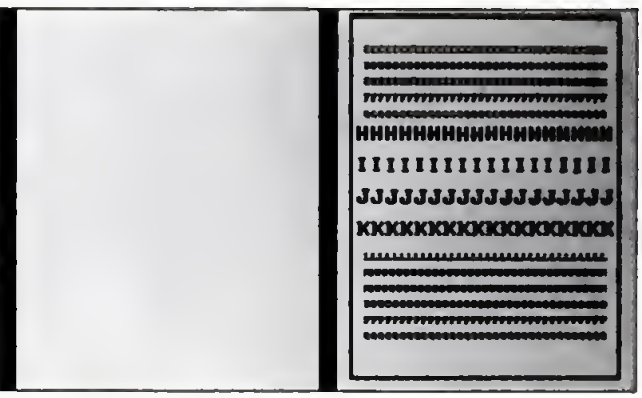
If Santa stuffs *ZCARD* into your stocking this year, you won't have to wait 11 months to boot up—it's a disk for all seasons. It's ready to print out customized cards for holidays, birthdays, and weddings. *ZCARD* isn't funeral- and bar mitzvah-compatible yet, but it's loaded for Groundhog Day.

Some card designs are for other specific holidays: hearts for Valentine's Day, a jack-o-lantern for Halloween, a turkey for Thanksgiving, elephants and donkeys for Election Day, and a leprechaun for St. Patrick's Day. Two are suitable for birth announcements, but only one illustration—an elephant sitting on a cake—is specifically for birthdays.

There's no need for that elephant's cake to get stale by serving it up at every birthday. *ZCARD* has a varied repertoire of 13 non-seasonal images that could accompany your birthday and friendship greetings and gaglines. Pictures of swans, cannons, trophies, clowns, Garbo, Bogart, or Teddy Roosevelt are as close as your IBM graphics printer.

In its *ZCARD* package, Zazda provides a stack of ivory tinted heavy card-stock paper with fan folds and perforated borders, ready to feed your IBM or Epson graphics printer (or an Okidata with Plug and Play).





Personal Messages

To design a card, first browse through the samples in *ZCARD*'s manual until you see an illustration that suits your occasion. Each card format offers numerous lines where you can place letters of a given size. The formats usually have enough options so that making a suitable message fit needn't be a process akin to solving a diagramless crossword puzzle.

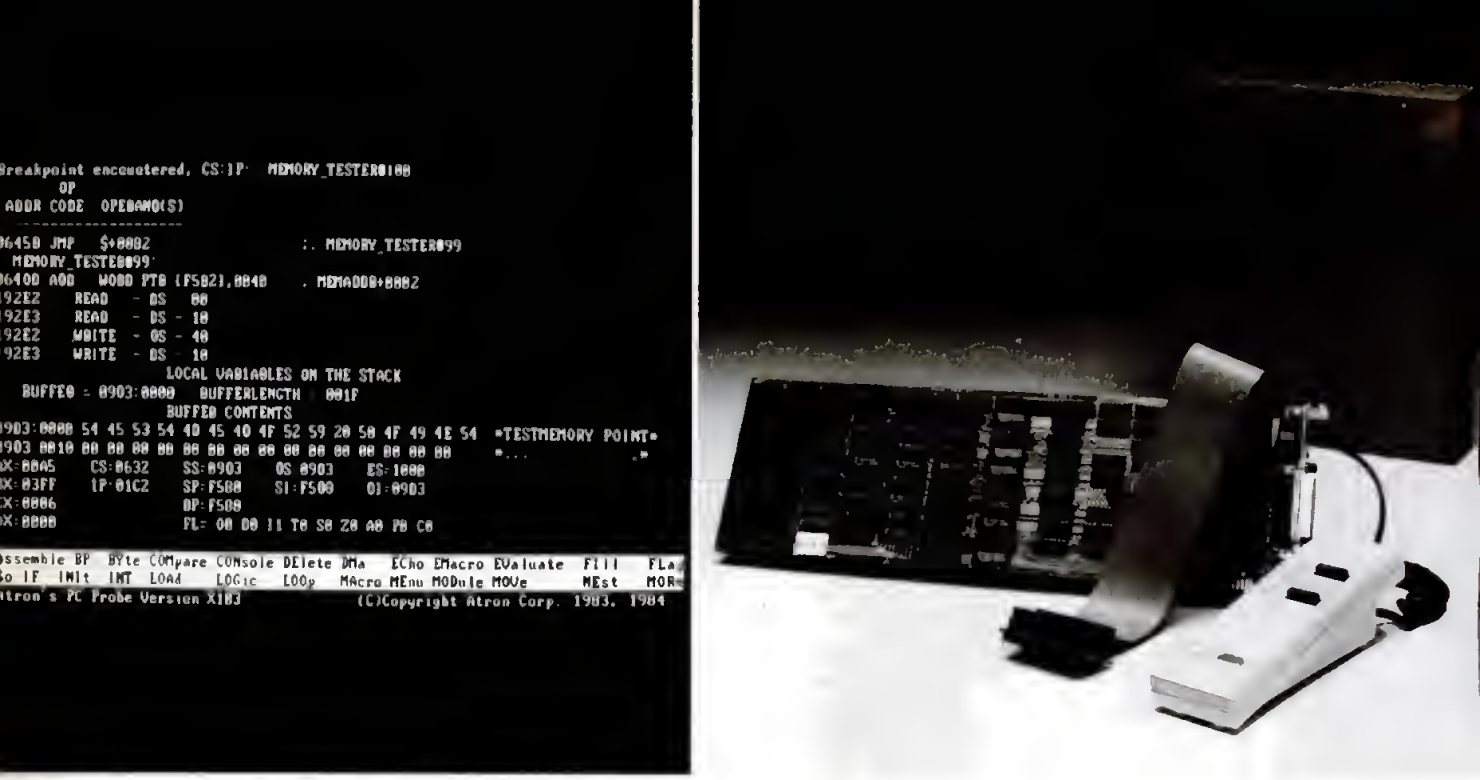
When you're ready to print your card, load *ZCARD*, select the format from a menu, then fill your text in the fields on screen. Then say how many copies you want to print (from 1 to 99), and start printing. It takes about 4 minutes for each card to print out.

If your creativity isn't satisfied just by writing the messages on your cards, soon Zazda may provide artistic freedom as well. The company plans to make available *ZCARD DRAW*, a commercial version of the joystick-guided drawing software used by Wayne E. Hohl to illustrate most of the cards in *ZCARD*'s collection.

Writing on the Wall

If you have feelings that seem too large to convey through puny 4¼-by-5½-inch cards, you could express them to the world on a banner, generated by your PC and *ZBANNER*, a related Zazda program. *ZBANNER* gives you a flexible edit screen on which you can design your huge messages. Letters can be formed of any characters in 15 different sizes, with black-on-white or reverse images. You can position characters at the top, center, or bottom of the printer's paper.

You can modify all these different characteristics throughout a single banner. This flexibility might have made specifying a banner a very complicated process, but the program offers sensible default values for every design feature. *ZBANNER* won't force you to be any more creative than you want to be. ■



ATRON Announces A State of the Art Advance in Source Level Software Debugging

PROGRAMMERS AND MANAGERS know that finding bugs during new product development and over the entire product life cycle adds up to a significant portion of total product development cost and support time. Investing in the right debugging tools will greatly improve time to market as well as minimize development cost. Atron Corp. has the right debugging tools for the PC environment. These are:

1) PC PROBE
2) SOURCE PROBE
3) PERFORMANCE ANALYZER

These tools run on a PC or compatible.

A Snapshot of Real Time Program Execution
Program flow is saved in trace memory while running at full speed. PC PROBE can display trace data as high level language source code or as 8088 instructions. Real time trace answers the question "How did I get here"?

A Bullet of Proof Debugger
What good is a debugger that can be wiped out by an undebugged program? PROBE software is write protected and can't be changed.

Trap Memory
The PC PROBE has 8 breakpoints and can trap conditions such as instruction execution, read, write, IO, DMA, interrupt, or external logic probes. Breakpoints can also be set on ranges of address or data — symbolically too!

Don't Look in the Manual
The PC PROBE designers know the importance of EASE OF USE. The PC PROBE interface has a menu window which displays the syntax of each command — so you never have to remember how a command works. It also recalls the previous invocation of each command to save tedious typing — and tedious thinking!

Symbolic Debugging
Avoid the tedium of sifting through link maps to find out where things are. The PC PROBE uses your C, PASCAL, or assembly language program symbols.

Macro Commands
Why be limited by a fixed set of debugging commands? PC PROBE lets you create your own powerful macro commands with parameter passing, nesting, LOOPING and IF/THEN/ELSE control.

ANNOUNCING SOURCE PROBE

Why waste time with a debugger which shows your C or PASCAL programs in 8088 assembly language. Atron's new SOURCE PROBE let's you step, real time trace, and edit your Hi Level source code during debug. Display data structures in the format which your program uses.

PERFORMANCE ANALYZER

How do you find time critical program problems or know where to start performance tuning your software? Get Atron's new Software Performance and Timing Analyzer. Then you can display histograms of how your programs run — by time or by events. You can perform many different timing measurements.

Atron has many happy customers who have made critical product schedules because of PC PROBE. Why waste time on primitive debugging techniques? — Call us today and ask for your 12-page data sheet.

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CIRCLE 156 ON READER SERVICE CARD

PRODUCT REVIEW

Transfer Rates Make IBM's Cluster Less Network, More File Copier

BY WINN L. ROSCH

IBM Cluster System
IBM
P.O. Box 1328
Boca Raton, FL 33432
(305) 241-2733

IBM Personal Computer Cluster Program	$ 92
IBM Personal Computer Cluster Program Five-Pack	400
IBM Personal Computer Cluster Adapter	340
IBM PC*jr* Cluster Attachment	400
IBM Personal Computer Cluster Cable Kit	110

If you call IBM's Cluster system for linking PCs together a "network," company spokesmen will reel away in horror. They're quick to defend that it is *not* a network, even though a sketchy description might make you think that's exactly what the Cluster is.

Like a network, the Cluster hardware, announced in February and now available, connects PCs, XTs, and PC*jr*s using coaxial cable (standard RG-59). With this new Cluster software, each PC can talk to the others, share files, and generally act as if all were networked together.

However, unlike most networks, the Cluster only permits file sharing and sending short messages—electronic memoranda—through the system. It does not permit peripherals (for instance, a high-speed laser printer) to be shared or controlled from remote workstations. This helps to prove IBM's point: It takes more than a coaxial cable to make a networking system.

Though the Cluster may not be on par with a network, it does open new territory. Essentially, it's a distributed processing system with a medium-speed communication and file transfer link, and it has its own niche between multi-user systems and true networked systems. It can be quite cost effective, particularly once several PC*jr*s are tied in. A complete five or six workstation system might run as low as *under* $10,000—complete with the IBM stamp of approval.

Leisurely Transfer

Notwithstanding the coax connection—which might imply multi-megahertz speeds like Ethernet—Cluster shuffles messages and data back and forth at a leisurely 375 kilohertz, in the same league as floppy disk speeds (typically 500 kilohertz) and roughly 40 times faster than a simple RS-232 connection. Loading a file from the Clustered hard disk also goes at floppylike speeds—for instance, expect to wait about 7 seconds for *WordStar* to be ready for your anxious fingers.

Rather than allowing direct data transfer, the Cluster software merely sets up a shared Winchester system. Winchester disk space in a master disk-server XT is divided up among the various workstations in the system. Information and messages are exchanged essentially by copying files back and forth.

Part of the server hard disk is given over to public files, which can be read by any station but written to only by a single designated public volume manager. Another part of the hard disk (maximum size, 360 kilobytes) may be used as a remote reset volume, allowing PC*jr*s in the system (which cannot be equipped with their own disk drives because the Cluster adapter draws ton much current from the PC*jr*'s meager supply) to boot up from the master Winchester. The balance of the server hard disk is sliced up as private volumes, one per Cluster station. (Unused space is essentially a private volume of the disk server station.)

Idiosyncratic Menus

The Cluster software for data and messages transfer is menu-driven. Like most menus, it's easy-to-use, but at times inconsistent and idiosyncratic. For instance, escaping from the information transfer program, which you must do every time you want to send or read an electronically dispatched message, is a romp through three layers of menu, each step requiring a different keystroke. Another minor annoyance is the Cluster's demand that you press keys 1 or 2 to indicate disk drives A: or B: Why?

To link the Cluster together, the information transfer program must be left running at all times. It quietly finds a place in the background, stealing just enough time from normal CPU operation so that it might be unnoticed—except for a discernible chunk of memory it swallows up. With both DOS 2.1 and Cluster's information transfer program in memory, almost a full 64 kilobytes are eaten away (only 55 kilobytes of useful memory are left on a 128K PC*jr* after display memory is subtracted).

Getting the Cluster to run each day requires more than just switching on the disk server station. Before joining the Cluster, each workstation must individually run the information transfer program, requiring some user-interaction (button pressing). For example, putting the program in an AUTOEXEC.BAT file (automatic execution at boot up) will require those keystrokes be directed from another file.

Trouble Shooting

Nor is the Cluster trouble-free in operation. If you switch off, accidentally unplug, or otherwise remove the disk server station from service, the individual Cluster workstations get no warning that their shared disks have vanished. And merely turning the server back on doesn't bring back the missing disks or re-establish the network.

A minor problem at the server station can become a big problem at the diskless workstations. Though they can continue to work on whatever is in their memories, any call to their now nonexistent drives will bring the world crashing down. There appears to be no way to save work in progress.

Because the whole Cluster system is based on the single hard disk, larger systems can be easily tied up. If any user calls for a directory from the master hard disk and stops it from scrolling off the sereen, the hard disk becomes inaccessible to anyone else in the Cluster until the scroll finishes.

XT Required

Up to 64 IBM computers can be clustered, of which one must be an XT (or PC with IBM hard disk) to act as the disk server. I found out about the XT requirement when I tried using my plain vanilla PC with another manufacturer's add-on drive and two PC*jr*s. I ended up having to borrow an XT from a friend to bring the system to life. My preliminary tests revealed that the Cluster was completely unwilling to function with other manufacturers' add-on Winchesters!

IBM wisely warns that approaching the 63 slave station limit with diskless computers will most likely be unworkable. The practical limit is largely dependent on the need for disk access, but a dozen machines seems reasonable.

Each full-size IBM personal computer requires its own full-length Cluster adapter board.

(continued)

IBM's Cluster *(continued)*
Each PC*jr* requires a separate Cluster adapter that plugs in like the PC*jr* parallel printer connector. Each computer in the system must also have a separate Cluster license—which comes with the software.

IBM will be the first to warn you that the Cluster will not give you true network performance and that if you want a real IBM network, you'll have to wait a few years. But if you understand the Cluster's idiosyncracies and limitations, the system can be an effective solution in that vast middle ground where one PC is too few and a true network—at several thousand dollars per node—is too expensive. Just be sure to buy an interruptible power supply for your Cluster disk server station. ■

Calendar of Events

DATE	EVENT	COMMENT	LOCATION	CONTACT
August 16-17	Local Area Networks	In-depth look at local area networks.	Ramada Inn—Old Town Washington, DC	Institute for Advanced Technology Control Data Corp. 6003 Executive Blvd. Rockville, MD 20852 (800) 638-6590 (301) 468-8576
September 5-7	National Software Show	Microsoftware specific trade show.	Anaheim Convention Center Anaheim, CA	Raging Bear Productions 21 Tamal Vista, #175 Corte Madera, CA 94925 (800) 732-2300 (415) 924-1194
September 11-14	UNIX Systems Expo/84	Conference, exhibition for users and resellers.	Los Angeles Convention Center Los Angeles, CA	Computer Faire, Inc. 181 Wells Ave. Newton, MA 02159 (617) 965-8350
September 20-23	Userfest/New York	Hardware, software, and accessories.	Madison Square Garden New York, NY	Northeast Expositions 822 Boylston St. Chestnut Hill, MA 02167 (617) 739-2000
September 27-30	Mid-Atlantic Computer Show & Software Exposition	Hardware, software, and accessories.	Convention Center Washington, DC	CompuShows P.O. Box 3315 Annapolis, MD 21403 (800) 368-2066 (301) 263-8044
October 1-4	Info 84	Hardware, software, accessories, and seminars.	New York Coliseum New York, NY	Cahners Exposition Group 999 Summer St. P.O. Box 3833 Stamford, CT 06905 (203) 964-0000
October 29-November 1	COMDEX/Europe	Hardware, software, and accessories.	RAI Congress and Exhibition Centre Amsterdam, The Netherlands	The Interface Group 300 First Ave. Needham, MA 02194 (800) 325-3330 (617) 449-6600
November 1-4	Consumer Electronics and Computer Expo	Selling show featuring consumer electronic and computer products.	Nassau Coliseum Uniondale, NY	Expositions Inc. 33 Bell St. W. Babylon, NY 11704 (516) 293-5533
November 2-4	Regional Educational Software Informart	Seminars on educational software developments.	Penta Hotel New York, NY	National Educational Software Informarketing Corp. 225 E. 57th St., 17H New York, NY 10022 (212) 688-8904

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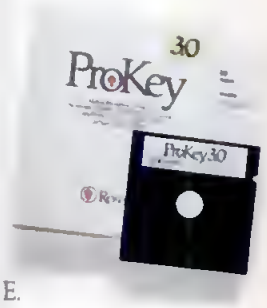

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To run ProKey, you'll need an IBM PC XT or jr., or a compatible and DOS (any version including 2.1). dBase II is a trademark of Ashton-Tate. Corporate and OEM licenses available.

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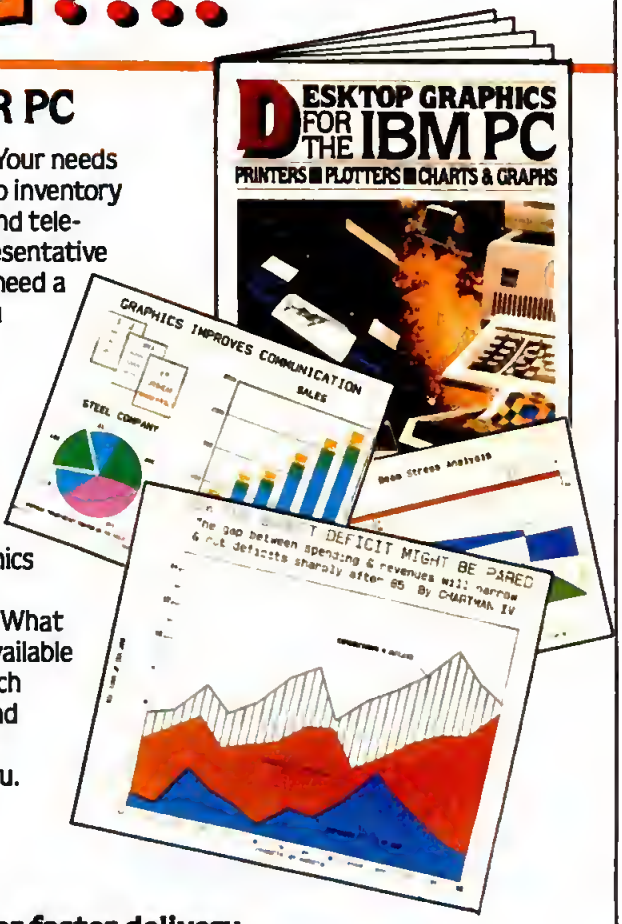
A GRAPHICS PACKAGE FOR YOUR PC



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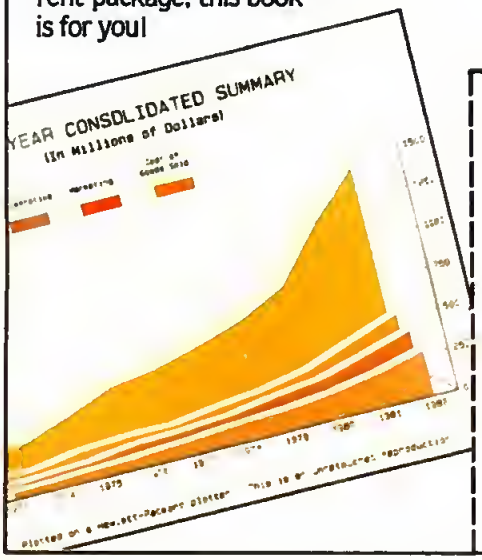

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PRODUCT REVIEW

Mini-Ledger: A Checkbook Balancer That's Hassle-Free For Home, Office

BY SAM PERKINS

***Mini-Ledger*, Version 2.0**
Paradigm Consultants, Inc.
39243 Liberty Street
Fremont, CA 94538
(415) 796-0543
List Price: $150
Requires: 128K RAM

Mini-Ledger just keeps getting better and, indeed, may now be setting the standard for the home computer market.

Since my first review of *Mini-Ledger* appeared ("Maxi-Value from a Mini-Ledger," *PC*, Volume 3 Number 1), Paradigm Consultants now has an updated Version 2.0.

In its original *Mini-Ledger*, I thought Paradigm had gone about as far as they could with a single-entry bookkeeping program without getting into complications that would make the program hard to learn.

If anything, this new version appears easier to learn and easier to use than earlier versions, in spite of its several new features. One of the main reasons earlier versions were easy to learn was because the program was written in such a way that it was not necessary for the user to know much about accounting. Essentially, if you could use your checkbook, you could use *Mini-Ledger*.

Checkbook Easy

The new version loses none of that simplicity and includes extensive on-screen help messages, in case you do forget what to do next. These messages are so comprehensive that they almost make the manual redundant. I say "almost make the manual redundant" because if you are completely new to computers and computer accounting, you should work through the exercises just to get a grasp of the major concepts.

One big improvement in the Version 2.0 manual is two sections at the back with good ideas of how to lay out your own chart-of-accounts. Following these are example lists of charts-of-accounts, perfect for people new to accounting in general, and to computer accounting, specifically.

Data Input

The data input module of *Mini-Ledger* is still its core and its most sparkling feature. I don't think I've ever seen a program in which data entry was easier or faster. You make entries across the screen rather than down, which allows the program to keep much more data available on the screen where it can be seen. Programs that force you to "fill out a form" down the screen almost always present you with a new, clean screen each time you store an entry, making it cumbersome to go back to previous entries.

Mini-Ledger's speed of input is enhanced because you can copy items from above with the tab key rather than having to retype them.

New Features

In the first review, I did not think it was possible for *Mini-Ledger* to print a profit and loss statement because the program allowed the user to set up his chart-of-account codes any way he wanted them. That meant the program would have no way of knowing which codes were for income and which were for expenses.

Version 2.0 does print a profit and loss statement complete with percentages. It gets around the drawback of not knowing how you have set up your codes by asking you. The new manual recommends that you put your income codes at either the top or the bottom of your chart-of-account code list. Then when you are printing a profit and loss statement, the program asks for your starting and ending income and expense codes, and assigns amounts accordingly.

I particularly like the new bank statement reconciliation feature because it works so simply. It is a two-step procedure in which you mark the checks and deposits that have been returned by the bank (two keystrokes) and then let the program do the rest. All you have to do is enter the ending balance shown on your bank statement and the program lists all unreturned items, totals them, and tells you what your final balance should be. If the balance it finds in your data is the same, you get a message telling you that your checking account balances. If not, you get a message telling you how much you are off.

Multiple Accounts

A minor drawback of the earlier *Mini-Ledger* was that it would allow you to keep only one checking account and one year of data on a disk. Version 2.0 keeps up to 50 months of data on a single disk, stored in the same account or in several different accounts. If you were using only one account, you could conceivably keep 4 years of data on line at all times, providing some interesting studies of patterns.

Version 2.0 of *Mini-Ledger* is a significant improvement in a program which I already strongly recommended. In the process of making it both easier to use and more useful, Paradigm has opened a new market: the home computer user. *Mini-Ledger* was originally aimed at the business community and nothing has been done that diminishes it in that regard. Now the help messages and the bank-statement-reconciliation process make it an ideal program for home use. And at $150 it is one of the most underpriced programs on the market. ■

Speaking of Computers: Please Don't Reveal the Exciting Conclusion

"The personal-computer industry is ready for another upheaval. The market has been consumed by IBM, which is selling an overpriced, ho-hum piece of hardware. The same conditions existed back in 1980, when the Apple II was the overpriced, dominant computer, and I challenged it with my Osborne I."

Adam Osborne, "What I Think About IBM"
Newsweek Access, *Fall 1984*

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People in the News:

Ralph and Randy Nelson

A father-son team created, and now maintain and market a clever database for tracking information about the IBM PC

BY BIL. ALVERNAZ

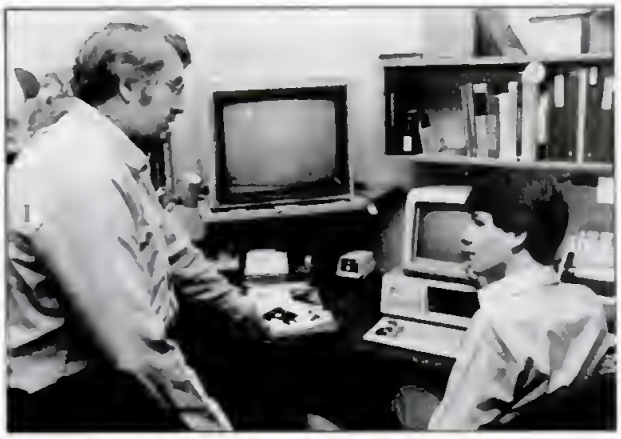
PALO ALTO—When Ralph Nelson set out to solve his problem of keeping track of magazine articles about the IBM PC, he didn't realize so many other PC owners were in the same deluge.

It took Ralph's 18-year-old son, Randy, however, to realize the marketing potential of what his father so painstakingly created. A physicist at the Stanford (University) Linear Accelerator Center in Califomia, Ralph originally bought a PC both to work at home and to access the mainframe computers at Stanford.

Then the frustration started. "I was hooked on the PC," says Nelson, whose computing experience goes back two decades. "But I just couldn't keep up with reading all of the articles, let alone remember where I read what."

Using *PC-FILE III* (the popular, user-supported database) Nelson created a database of magazine articles, letters, and news features about IBM Personal Computers. Nelson's simple and to-the-point structuring of the database proved the key to success of his ultimate product, *LETUS A-B-C*. Each article's listing includes a brief abstract. Searching for articles can be done by key word, subject, title or author—even month. What Nelson created is an overlay to be used with *PC-FILE III*.

LETUS A-B-C stands for Literature Evaluation Table User Service and is marketed like *PC-FILE III* (see "People in the News: Jim Button," *PC* Volume 3 Number 16, page 66). Customers send blank, formatted (double-sided) diskettes to Nelson at 3790 El Camino Real, Suite 2006, Palo Alto, CA 94306, (415) 493-4306, and he will copy *LETUS A-B-C* onto the disk. Then, after you use the product, "your contribution of $20 will be appreciated." Or, users can send in $20 for three months' database overlay.



Database listings of articles in *LETUS A-B-C* go back to 1982 (the "old days" according to Nelson). The complete reference set of four disks costs $40, with each additional quarter now $20. That complete set of *LETUS A-B-C* includes the following:

Disk #1: 1982—*PC Magazine*, *Personal Computer Age*, *Softalk*, and *Byte Magazine* (only the articles relating to the PC). Also included on this disk is a 10-page manual on using *LETUS A-B-C*.

Disk #2: 1983—*PC Magazine* (through June), *Persanal Computer Age*, and *Softalk*.

Disk #3: 1983—*PC Magazine* (July to December), *PC World*, *The PC Tech Journal*, and *Byte Magazine* (only PC articles).

Disk #4: 1984 (1st quarter) —*PC Magazine*, *Personal Computer Age*, *PC World*, *PCjr. Magazine*, *The PC Tech Journal*, *Softalk*, and *Byte Magazine* (only PC articles).

LETUS A-B-C contains all articles—"and just about everything else," says Randy Nelson—from those magazines. With each new quarter this year, Ralph and Randy plan to include more information with each issue of *LETUS A-B-C*. Subscription to the basic database overlay will stay at $20 per quarter, but for an additional $10 per quarter subscribers can get databases of additional magazines and also abstracts on IBM-related books.

Filling a Need

Randy Nelson didn't have to talk too much to convince his father to market *LETUS A-B-C*. Together they are now learning about marketing, business, people, and each other. Not that there were problems with their relationship to begin with, but this business has brought them much closer. "We're having a lot of fun with something that only Randy and I believed in to begin with," Ralph says proudly.

Both Ralph and Randy Nelson attribute their success to "having filled a definite need for IBM PC owners," and to the "guidance and encouragement" from Jim Button, author of *PC-FILE III*. Button's quiet and successful marketing concept, which the Nelsons have adopted, is "user supported software." This approach encourages users to copy and share the diskettes with others. That virtually eliminates the costs for marketing and distribution—and keeps the product affordable.

Though this PC success is somewhat new to Ralph, he has established his own identity in his profession as radiation/health physicist. He has written books and dozens of articles, and he enjoys a position he has held at Stanford since 1958. "It's the best of all worlds," says Ralph. "All of this and I'm now working with my son, too."

Filial Interest

Randy Nelson, who graduated in June from Gunn High School, plans to pursue a career in computer science. A year ago he didn't know much at all about computers and wasn't too interested in what his father was doing with the IBM PC. However, since their involvement with *LETUS A-B-C*, Randy has studied BASIC at Foothill Junior College (while still in high school).

And at the rate Randy is going he just might be teaching a class before too long—on how to market software.

LETUS A-B-C works with DOS 1.1 or 2.0 (and newer versions). *PC-FILE III* is available from Jim Button, Box 5786, Bellevue, WA 98006, for $49. (He no longer copies the program onto diskettes sent in to him.) ■

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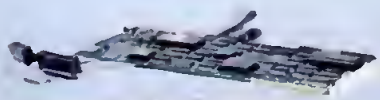

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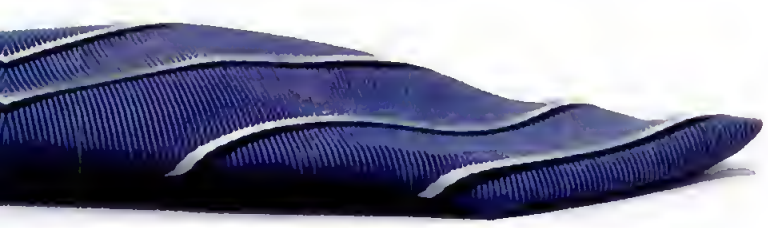

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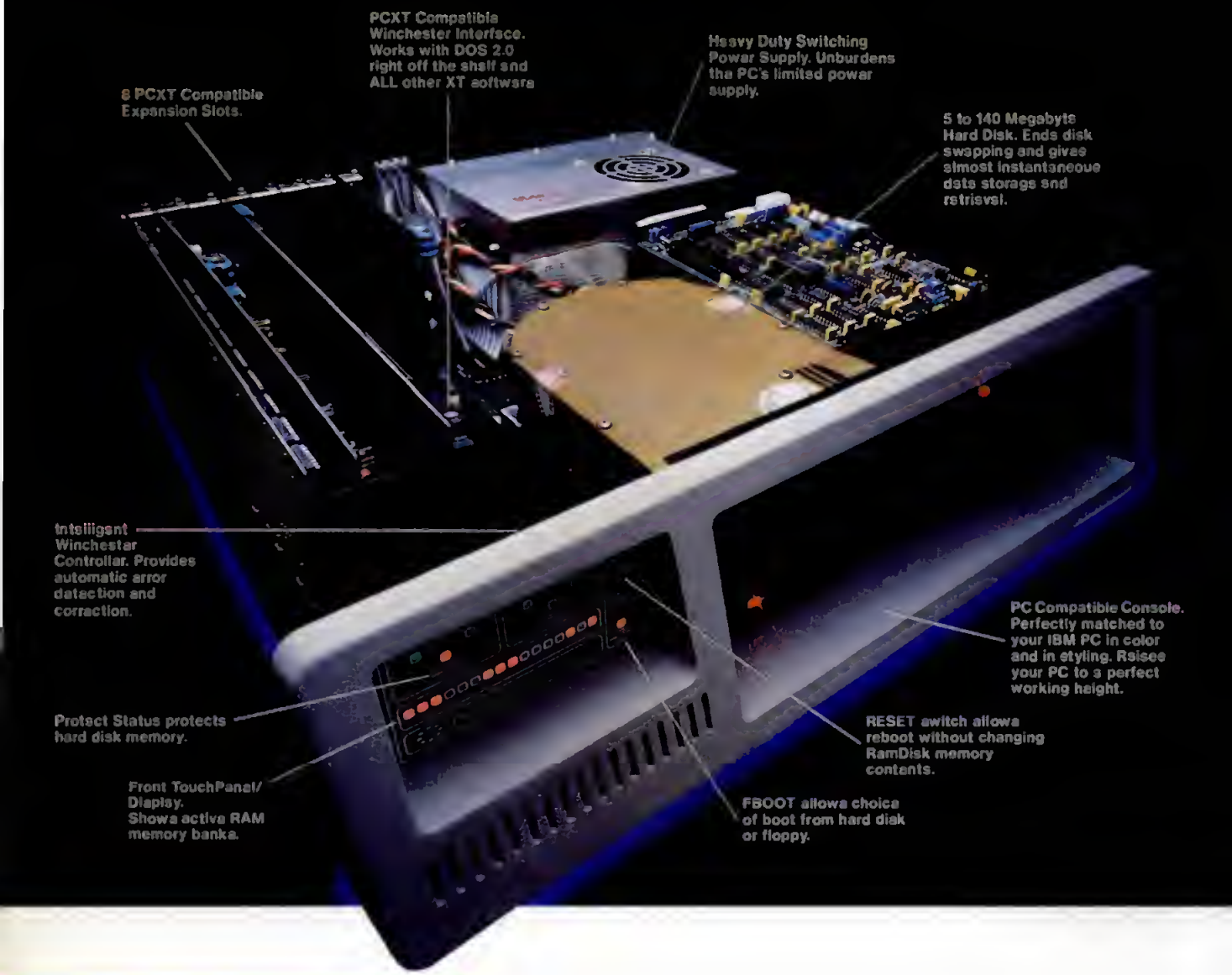

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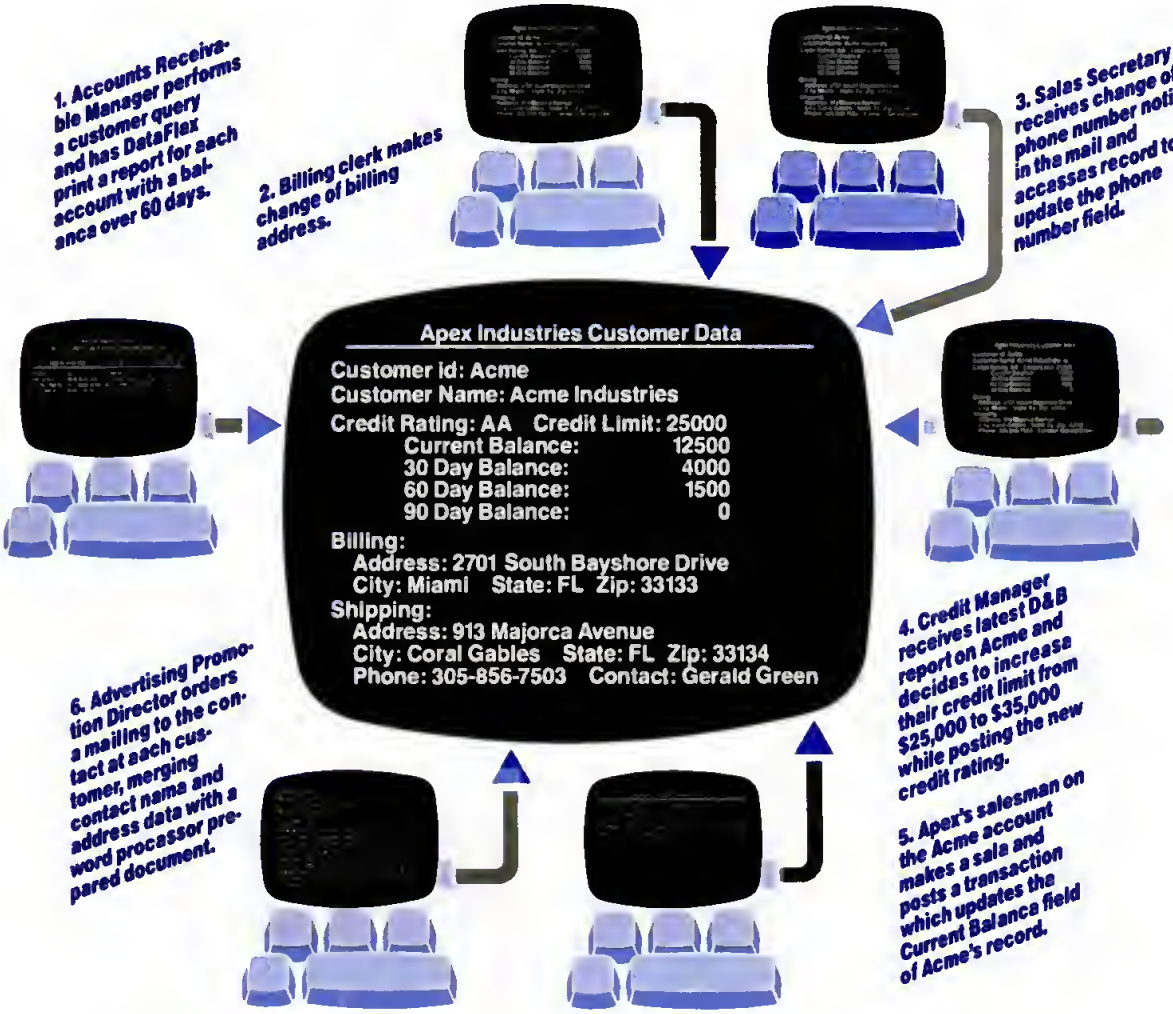

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Consumer Guinea Pigs

The software industry's practice of using the paying public to debug its products has sent consumer confidence through the floor. Producers should be using more beta testers.

The manufacturer of a new software package called me recently and asked if he could receive a prepublication copy of a review *PC* was publishing of his product.

"We can't do that," I told him, surprised that he would even ask. I explained that, as I see it, a review of a product cannot be legitimate if it first has to go to the manufacturer for approval.

"Oh, no, we won't touch the article," the man assured me. "But if your reviewer found any bugs, we want to be able to correct them."

It may be naive of me, but I have always assumed that, when a product finally goes on the market, it is the best that the manufacturer can make. However, it seems that software producers have a different philosophy; they market a reasonably well-researched package and then wait for consumers to report problems.

The scenario goes something like this: A new piece of software that counts angels on the head of a pin goes on the market, and the first few hundred packages are sold. Consumer A purchases a copy of *Angel Counter* on the strength of an ad in a computer magazine, runs the program, and finds that it counts two-winged angels but not three-winged angels. Since consumer A is interested in the three-winged variety, he calls the company and complains.

The head of consumer relations gushes, "We're terribly sorry. Our software people totally missed that problem. We'll fix that immediately and send you a copy of the new version."

Barbara Krasnoff

However, consumer B, who also bought the new software, is unaware that any deficiency existed in the first place, so she is stuck with the uncorrected package she bought—even if she later finds herself with three-winged angels on her hands.

Consumer Anxiety

Manufacturers should note that this state of affairs isn't doing much for consumer confidence. Here at *PC Magazine*, we found out just how anxious consumers are when we recently published our seven-part "Project: Database" series. The day after the first issue came out, we began getting panicky calls from corporate data processing managers who wanted to know how we had rated the database packages in which they were planning to invest several thousand dollars and work hours.

Others, pressured by their superiors to purchase a new database as soon as possible, called us begging for a list of the best-rated products—before the entire series had been published. The message they were sending was that they didn't feel that they could entirely trust the claims of the software manufacturers.

This crisis of confidence is becoming so serious that one of our editorial assistants recently spent 15 minutes on the phone, fending off a *consultant* who wanted to know which of the software packages she would recommend.

I realize that it may be impossible for a software company to catch all the problems in a program by itself. But, at the same time, it is rather unfair to make the public serve as unwitting bug exterminators—especially when it is paying for the privilege.

In fact, as an editor, I object to it myself. When *PC* is paying a writer to review a product, we do not expect to be

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CIRCLE 101 ON READER SERVICE CARD

paying for a manufacturer's product testing as well. When a manufacturer calls me to ask, "Did you find any bugs? We'd like to take care of them before the review comes out," my first, rather mercenary impulse is to ask, "What will you pay me for the service?"

Many manufacturers have been calling *PC* recently, asking for an outright consultation—and are willing to pay generously for the service. It's become common to walk into editor Bill Machrone's office and see him smiling politely into the phone as he refuses an offer to act as consultant for some highly placed company official.

Tempting Offers

Many of our editors have found that, when they are trying to make a 2-week editorial deadline, a call from a software marketing manager who just wants to take a few (say 60 or so) minutes of their time is singularly inopportune. And then there is the problem of having to constantly deal with what we admit are very tempting offers. It's not that we wouldn't *like* to make a few extra dollars on the side—but there are such sticky considerations as journalistic integrity. . . .

I don't want to give the impression that software manufacturers must resign themselves to turning out inadequately tested products simply because the staff of *PC Magazine* is not usually available. A tremendous resource, in my opinion, is not adequately exploited—the many hackers who would love to serve as product testers. Although some manufacturers do employ individuals as beta testers, this practice is not as extensive as it should be. Most of the people who review hardware and software for *PC Magazine* do it as much for the simple pleasure of tearing apart a new product as for the check we send. It is hard to imagine that, out of the huge pool of experienced users, manufacturers can't find a few people who, for a reasonable fee, will put a new program through its paces—*before* it goes out to the customers.

In recent years, businesspeople have talked a great deal about the undesirability of government regulation and the upholding of product standards through industry self-monitoring. Whatever your opinion on that subject, it seems clear that the microcomputer software industry has not set a very good example. ■

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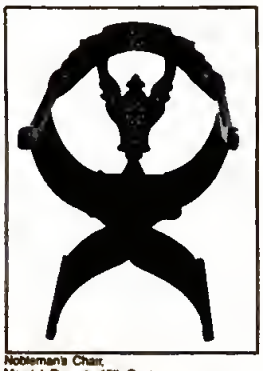

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CIRCLE 461 ON READER SERVICE CARD

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Computers In the Humanities

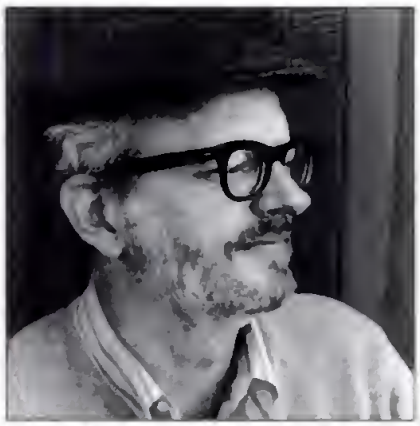
Computers and the humanities haven't always been on friendly terms, but computer-aided instruction has much to offer humanistic education in the way of preparation, communication, art, and music.

Rote drill may be the heart of computer-aided instruction, but it's probably not the best way to teach the humanities. Nonetheless, there remains a surprisingly wide scope for the employment of computers in the preliminary stages of humanities education. In the humanities, students and professors strive to discover or create coherent patterns from a body of isolated facts. But students who are to participate in this creative process must first possess at least some of these facts. Computers can contribute significantly to this first step.

Computers can, for instance, administer a preliminary examination certifying that each student brings enough knowledge and skill to the creative part of humanities study to make the experience worthwhile. To test this, professors might make up a set of multiple-choice questions based on assigned readings. Students could take the test all together at one time or they could use computers on their own and test themselves when they are ready.

Another potential benefit of using computers for objective testing in the humanities is the information that professors and students can glean from the test. Students can quickly see the areas in which they are strong and those that require work. Feedback could help professors recognize patterns of knowledge in a student to tailor the curriculum accordingly. This feedback will add needed efficiency to the educational process.

Another obvious advantage of the computer is the increased potential for visual displays. In an art history course, for example, the professor might wish to illustrate the development of perspective during the Renaissance. With new computer graphics systems, students could experiment with perspective by using the computer to draw lines converging on a distant point and then sketch in a picture based on the perspective created. They could then instruct the computer to compare their creations to renderings of actual artistic works of the period.



Norriss S. Hetherington

Music education can also benefit from computer use. New systems will give students the chance to change a composition or arrangement to understand why particular combinations of notes or timbres work while others don't.

Better Access

The humanities traditionally require many textbooks and other assigned readings that are often available only on reserve at the university library. Educational materials stored either on individual disks or on the campus mainframe could be readily accessed at all hours. When students can devote less time to obtaining materials, they have more time to read and discuss them.

Research papers are a basic educational tool in the humanities. Current technology will make it easier for students to work together on their research by allowing them to see drafts of fellow students' efforts and to discuss the merits of different approaches.

Far from isolating students from one another, computers can be expected to facilitate increased student and faculty interaction at a level only dreamed of until now. ■

Norriss S. Hetherington is a research associate in the Office for the History of Science and Technology, University of California at Berkeley.

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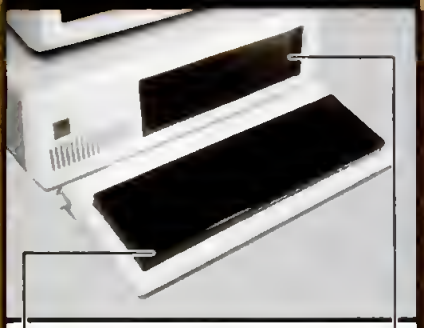

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Letters to PC

Crossed Responses

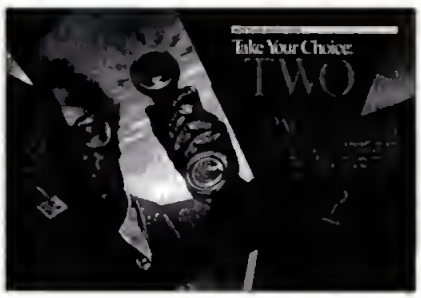
I had mixed responses to Alfred Poor's recent article on the *Crosstalk XVI* communications program ("Take Your Choice: Two Communications Packages," *PC*, Volume 3 Number 12). As the semiproud owner of Version 3.4, I feel well qualified to comment.

I am sure that Poor's hands-on experience with *Crosstalk* on an IBM PC was careful and extensive. But when I purchased a machine-specific package for my Eagle 1600, it had a problem severe enough to just about preclude its use.

Specifically, whenever a file larger than 1K was uploaded, the light on the disk drive in use would come on and the machine would lock up tight. It would require a cold boot to correct. This meant that uploading a 10-page legal document required approximately 40 individual files, a situation best described as inane.

I made over eight unreturned phone calls to Microstuf, Inc.'s technical support people before they even acknowledged that the problem did, indeed, exist. They advised me that I could correct my problem by returning the original diskette, along with $20 for the newest version. As my current version was less than a month old, and less than a week old when I first contacted them about my problem, I thought their policy was unfair. They offered to exchange the diskette for free, without the documentation, but said that there were "many new features that I wouldn't be aware of without the new manual." I finally gave in and sent in the diskette and a check.

I received my upgrade 2 weeks later and, less than a week after that, a letter from Microstuf's senior technical representative, Kevin Peterson. He said that my comments about their lack of technical support were correct, but that it was not their normal way of doing business. He said that, as a result of my situation, their technical support department had been briefed on their policies and the changes made to their *Crosstalk XVI* program. It appears that my upload problems were



inherent only in machines with 128K RAM memory, and that the problem was corrected in Version 3.4. He also included a refund of my $20.

I was not only mollified by his action, but impressed enough to recommend their product to over half a dozen associates. Unfortunately, I did not have the chance to use the new version until approximately 30 days after its arrival.

Imagine my surprise when I did use it, and found that the problem still existed, and that the recently included XModem features had a tendency to occasionally lock up BBS screens after downloading files. I added another 128K of memory, to no avail.

Maybe the problem is limited to the Eagle version, but I feel that Microstuf shouldn't offer the program with its current errors.

Robert J. Rydeen
Fremont, New Hampshire

Since receiving this letter, PC *learned that Rydeen was contacted by Jeffrey Garbers, vice president of product development for Microstuf, Inc. Garbers believes that Rydeen's problem with* Crosstalk XVI *is a result of a problem in his Eagle 1600's ROM BIOS. Certain versions of the BIOS apparently disrupt interrupt-handling procedures when screen scrolling occurs at the same time as disk I/O and communications processing. Garbers recommended that Rydeen contact Eagle Computer for a ROM upgrade.*

At last report, all parties were working to clear up the problem.—Ed.

Cursors! Foiled Again!

As a reader of *PC Magazine*, I have always found that you are helpful to your readers. I'm hoping you can help me with a problem.

I own an IBM PC with an NEC monitor and have always been bothered by the rapid flickering of the cursor. I know that on some systems, you can set the cursor to blink or to stay on permanently. I have been told that this blinking can be set and changed, but no one that I have asked knows how to do it on the IBM PC.

Do you have a solution? Most users that I have talked to also believe that the rapid blinking contributes to eye fatigue and would like to be able to do something about it, too.

Rodger A. Young
Berkeley, California

IBM's blinking cursor is fixed by the hardware, not by manipulating the control registers on the 6845. The only control you have over the cursor is its vertical size.

IBM's cursor is "opaque," meaning that the character under a block cursor is not displayed in reverse video. As a result, you can see the character only while the cursor is in its "off" state. So it's impractical to turn the cursor blink off.

A number of terminals automatically switch to a slower blink rate when they

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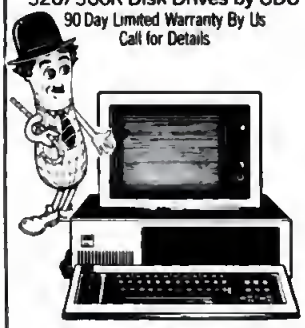

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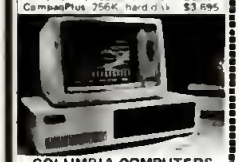

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FREE interface cable included!

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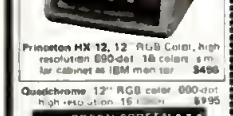

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Multi-Function Cards for IBM PC and XT

(Each card now comes w/ SuperDrive & SuperSpool)

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with parallel, serial ports & clock	$227	$257	$312	$367	$422	$477	$532
above plus game port	$247	$277	$332	$387	$442	$497	$552

MegaPlus II Cards

Amount of memory installed on board	None	64K	128K	192K	256K
w/serial port No. 1 & clock	$226	$266	$321	$376	$431
w/either parallel or serial port No. 2	$281	$301	$356	$411	$466
w/both parallel & serial port No. 2	$296	$336	$481	$446	$501
Game port add $50	MegaPak Option 128K	$199	256K	$299	

QUADRAM

QUADMASTER II – 9 Function memory expansion card for IBM PC

- Up to 384K
- Game port
- Chronograph
- Parallel port
- Serial port
- Qwasp Directs out put to LPT 1, 2 or 3
- DuoRAM drive
- Master spool
- I/O bracket

Amount of memory installed	OK	64K	128K	192K	256K	320K	384K
w/parallel, serial, game ports clock	$238	$276	$236	$376	$425	$435	$535

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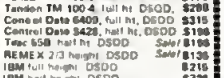

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Hard Disk Size	INTERNAL with controller	EXTERNAL without controller	EXTERNAL with controller
10MB	$1,625	$1,295	$1,895
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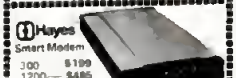

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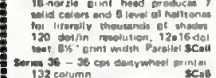

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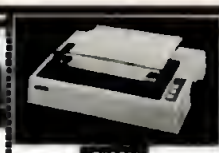

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FX-80, 160 cps, 80 col	Call
FX100, 160 cps, 132-col	Call

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Delta 15, above w/132 column	Call
Radex 10, 200 cps, 80 column	Call
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1550-SCP above but w/ 3-colors	$799

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84S, above but serial	$1,059
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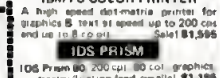

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CIRCLE 235 ON READER SERVICE CARD

LETTERS TO PC

change from an underline to a block. Unfortunately, however, IBM wasn't so considerate. Even if you were ready to pick up a soldering iron in anger, you'd find that the blink rate is digitally derived, not generated from an oscillator or timer. Sorry.—Ed.

1-2-3 Beep!

Stephanie Stallings presents "A 1-2-3 Wish List" of features she'd like to see added to Lotus' *1-2-3* ("1-2-3 Links Arms with Business," *PC*, Volume 3 Number 7). Her second wish for a beep at the end of a recalculation has, in fact, already been granted by Lotus. The simple keyboard macro

```
{calc}
{home}
{left}{left}{left}
```

will cause *1-2-3* to beep three times at the end of a recalculation and return the cursor to cell A1.

Paul Lichtman
Livingston, New Jersey

Wish List Come True

In "1-2-3 Links Arms with Business," Stephanie Stallings included a wish list of features Lotus' *1-2-3* should have. At least two of those things can be done.

Wish 11 was for embedded control codes in cells to permit printing several consecutive pages (and other print commands) without leaving blank lines in the worksheet to make the page-break come in the correct place. This can be done with the use of macros. The macro I used (which should be typed on one line) is as follows:

```
/PPRA1.H26~GPRA28.H31~GPRA32
.H53~GPPQ
```

After typing this macro, press the space bar once and then Return. Any other printer command codes desired for printing format, type size, and so on could be included in the macro.

Item number 15 on the wish list was the desire to view the graphs on a mono-

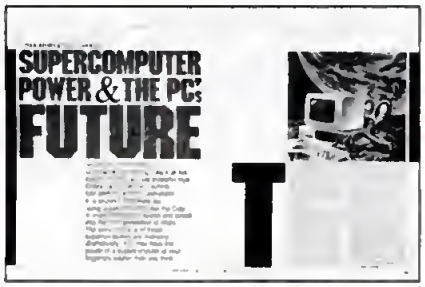
chrome monitor. I can do that on my system because I have an Amdek monitor with the IBM color/graphics card. It is also possible to see the graphics on an IBM monochrome monitor with the Hercules graphics card.

I enjoyed your review of the spreadsheet programs and the advance review of Lotus' *Symphony*. I hope that a mouse used with *Symphony* will cure the annoyance of having the cursor keys on the 10-key pad. That is the big item on my own wish list. It would also help me if Lotus added a stronger reminder to save before exiting.

Barbara Alm Vinson
Mentor, Ohio

Supercomputer Power

I would like to commend Paul Somerson on his article "Supercomputer Power and the PC's Future" (*PC*, Volume 3 Number 9). It is tremendously important to educate the public about supercomputers, their potential applications, and the vast need for researchers and university students to have access to them. Only then will the United States have the trained supercom-



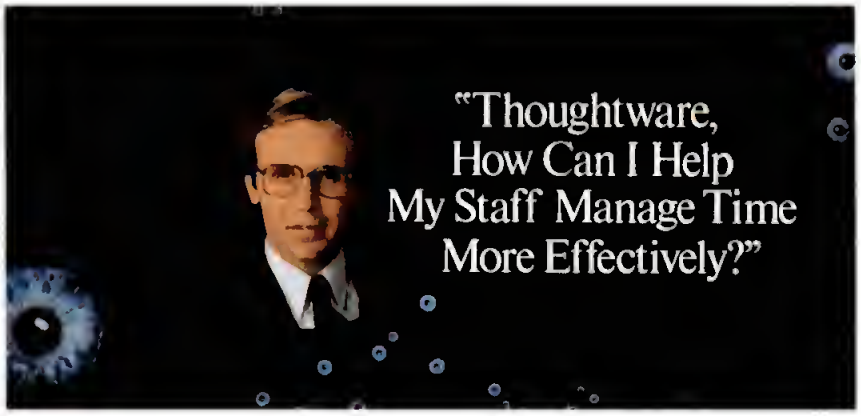
puter users who can go into industry and take advantage of the power available to them through these machines. And as long as this happens, the United States can remain on the forefront of supercomputer technology.

Linda J. Freede
St. Paul, Minnesota

Deluxe Version Deficiencies

Since I had purchased *Volkswriter Deluxe* a short time before the appearance of Dara Pearlman's review ("More Than Just

CIRCLE 118 ON READER SERVICE CARD



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CIRCLE 424 ON READER SERVICE CARD

LETTERS TO PC

Plain Volks," *PC*, Volume 3 Number 11), I was very interested to see how her assessment compared to mine. I have been using Version 1.2 of *Volkswriter* for about 1 year, primarily for preparing a manuscript with a generous distribution of subscripts, superscripts, underlinings, and computer programs spread throughout the text. I have been very pleased with the speed, simplicity, and power of the program, and after reading a lengthy review of *Volkswriter Deluxe* (provided by Lifetree), I eagerly sent in my $90 to take advantage of the additional features of the latest version.

After going through the setup process and the on-disk tutorials, I realized that I needed additional memory to avoid file spillover and the potential time penalties and possible loss of portions of my files. I purchased an additional 128K of memory to double my memory size to 256K, and at that point I felt ready to explore new word processing frontiers.

For the most part, the new features in *Volkswriter Deluxe* represent a significant improvement over what I considered to be an already powerful and efficient package. So far, however, I have two complaints. The first is that printing on my IBM graphics printer is approximately one and a half times slower than printing with Version 1.2. I called Lifetree to ask them about this, and I was told that slower printing is the price I have to pay for the ability to use *Deluxe* on a wide variety of printers. I was also told that there is a good possibility that *Deluxe* users who want to recover their previous printing speed may be able to purchase a version of *Deluxe* that can only be used on IBM-compatible printers. I was very disappointed by this response, and a comment to this effect in Pearlman's review would have given potential purchasers of *Deluxe* a chance to consider this feature before making a purchase.

My second complaint concerns the inability of *Deluxe* to display on-screen right justification. Although right justification can be achieved at the time of printing, the inability to examine the effect of

justification before printing can lead to unexpected printed results and increases the odds of a failure on the part of the user to apply the justification feature to one or more paragraphs in a long text file.

I expect that my appreciation of other *Volkswriter Deluxe* features will overcome my disappointment in these two deficiencies, although I do hope that Lifetree will correct them in future versions. I enjoyed Pearlman's enthusiastic and balanced article, and I look forward to reading more of her work in future issues.

Mario J. Gonzalez, Jr.
San Antonio, Texas

Thumb Print Test

Howard Karten covered all sorts of exotic torture tests in his article about hazards for floppy disks, but he ignored the one that we all worry about most ("Stress Tests for Floppies," *PC*, Volume 3 Number 13). I bet he handled his diskette by the edges as he slipped it into the microwave oven, and he surely kept a gentle grip on one corner of the envelope as he waved it in front of the X-ray machine.

Come on. Tell us about the one that really counts. The laundry machine and the welding cable tests will be great for the TV version of your article, but meanwhile, tell us what happens to your data when you plant a big fat thumbprint right smack on the vinyl.

Joe Rigo
New York, New York

Floppy disks will read over thumbprints with aplomb. It's the abrasive dust that sticks to the grease that ultimately does in the read-write head on the disk drive. Although a dust-contaminated drive can be fixed with any of the commercial drive cleaning kits, you should copy a fingerprinted disk to a new one at the earliest opportunity.—Ed.

Who's Right?

In a sidebar to "PC Passion And Other Romances," author Whitley Streiber is quoted as saying that green monitors dried

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LETTERS TO PC

up his tearducts, and that he had switched to an amber monitor to help correct the problem (*PC*, Volume 3 Number 4). However, in the June issue of *Personal Computing*, experts are quoted as saying that there is no "human performance" difference between the green and amber monitors. Who's right?

Also, in your March 20 issue, Stephen Becker says that IBM's program license agreement allows the use, copying, and modification of IBM software only on a single machine ("Software Licensing Questions," *PC*, Volume 3 Number 5). If this is true, then why does IBM's two-page advertisement (showing the Tramp at a bus stop with a diskette in his hand) imply that programs that were originally bought for the regular PC at the office can be brought home for use on the PC*jr*? In court, could IBM's advertising hype torpedo the legal strength of their license agreement?

William Yeman
Vernon, New York

If Streiber says his eyes felt dry, who are we to argue? We believe the test results, however. Regarding IBM's ad, we can only assume that the Tramp is holding a data diskette, not an illicit copy of a program.—Ed.

Timely News

Why do I pay for a biweekly subscription to *PC* and then receive an issue on June 13 with a cover date of July 10? To top this off, the July 10 issue didn't include any information about the price decreases announced by IBM on June 7. I was even more confused when the weekly publication *(PC Week)* arrived on June 12, with information about the price decreases.

I suppose I can think of a couple of reasons as to why you can't turn the news around fast enough to be really timely, but for the life of me I can't figure out that silly July 10 date. I hope you will provide a logical answer soon.

Rod Weeks
Cincinnati, Ohio

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CIRCLE 136 ON READER SERVICE CARD

LETTERS TO PC

The cover date of a magazine can be confusing. In our case, the cover date is really the "off-sale date," the last day the magazine is available on the newsstand. In practice, the magazine comes out about 3 weeks prior to this date. The deadline for "PC News" is a full month later than that of the rest of the issue, but that's still 3 weeks before it goes on sale. That's some kind of record for a feature magazine the size of PC, *but not in the same category as a newsweekly paper, which is why we publish both.—Ed.*

Corrections:

The Time Spectrum SB384 Board by Personal Systems Technology (Persyst), when configured with 384K RAM, lists for $895, not the bargain price of $395, as reported in New On The Market, *PC*, Volume 3 Number 7. The $395 price refers to the basic board, which is equipped only with 64K RAM.

The Instructor is available from Individual Software, Inc., not Cdex as reported in "Are Disk Tutorials The Best Teachers?" (*PC*, Volume 3 Number 7). Its address is: 1163-I Chess Dr., Foster City, CA 94404, (415) 341-6116.

If you had trouble following "Lisa Williams: Her Changing Goals" (PC News, *PC*, Volume 3 Number 13, page 39), we can explain why. Despite our best efforts a layout error resulted in a reversal of the second and third columns of that story. Sorry for the confusion.

How to Write to PC

Do you have a comment, compliment, or criticism about something you read in *PC*? A question you'd like to open up to other readers? Send it to "Letters to PC," *PC Magazine*, One Park Avenue, New York, NY 10016. We are not able to answer letters personally.

All letters become property of *PC Magazine* and may be subject to editing. We cannot print letters that do not include a name and address.

Support and Control In Flabby Programs

Norton explains the difference between systems programs and application programs while discussing how programmers gain and lose control of program size.

The terms *systems programming* and *applications programming* are used to describe two widely different kinds of program development. A systems program, such as PC-DOS, typically works closely with the system's hardware. Its purpose is usually to support the general use of the computer. An applications program's relationship to the hardware is more remote; its purpose is usually to accomplish some stated task, such as keeping your checkbook straight.

The fundamental difference between systems programming and applications programming boils down to control versus support. Basically, if you're writing system programs, your goal is to gain control over what goes on while your program is working. If you're writing applications programs, you want support; you need to have things taken care of for you. Examples of support are file control (opening and closing files with a minimum of fuss) and error handling, both of which will free you from a great deal of tedious work and allow you to carry out your main task.

Many programs clearly fall into only one category but, surprisingly, some take on aspects of both. Word processing programs, such as *VolksWriter*, and integrated packages like *1-2-3* usually need to work both ways. For tasks like working with the display screen and the keyboard and for managing the use of memory, these programs usually strive to assume complete control, without the interference of any supportive and protective layer. However, when these programs read and write disk files, they are better off letting standard support subroutines worry about the details, such as finding space for files and recovering gracefully from I/O errors.

Peter Norton

Since many programs must work both ways, programmers developing them need a way to determine when they have total control over the computer and when they are being supported by standard subroutines.

If you want to assume total control, you can write your programs in assembly language, which will enable you to get anything out of the computer that is possible. Nothing will get in your way. But if you choose this approach, you will have to tediously take care of every little, complex detail—input and output, handling any errors that occur, in short, deal with the whole mess.

Choosing a language like BASIC is like wrapping yourself in a security blanket of support and high-level services. It can find a file, deal with bad input, paint a color on the screen, or play music—it's all there. The price you'll pay is efficiency; to perform special magic, you'll usually have to break out of that security blanket.

Longing for Control

The people who design programming languages and write compilers for them often ignore this issue, believing that the features and support that the programming language provides are all that you will ever need. While this belief may be justified for some applications, programmers often find themselves chaffing under the rules that their compiler sets up for them. At times, no matter how much you like programming in a high-level language, you may nevertheless long for the extra control and freedom that assem-

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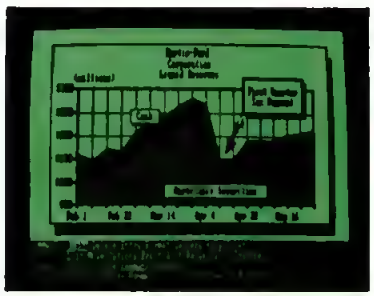

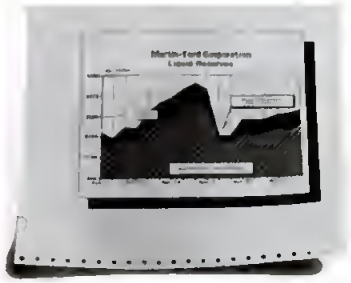

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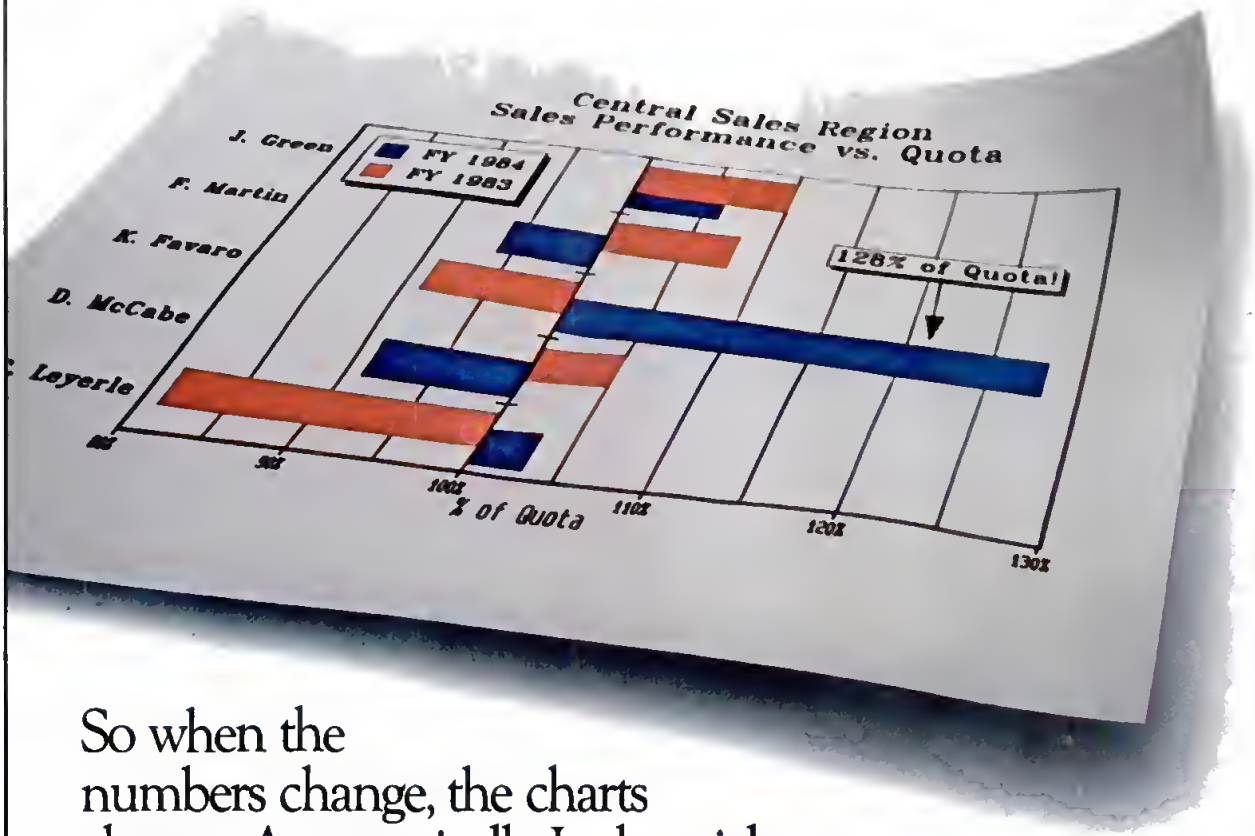

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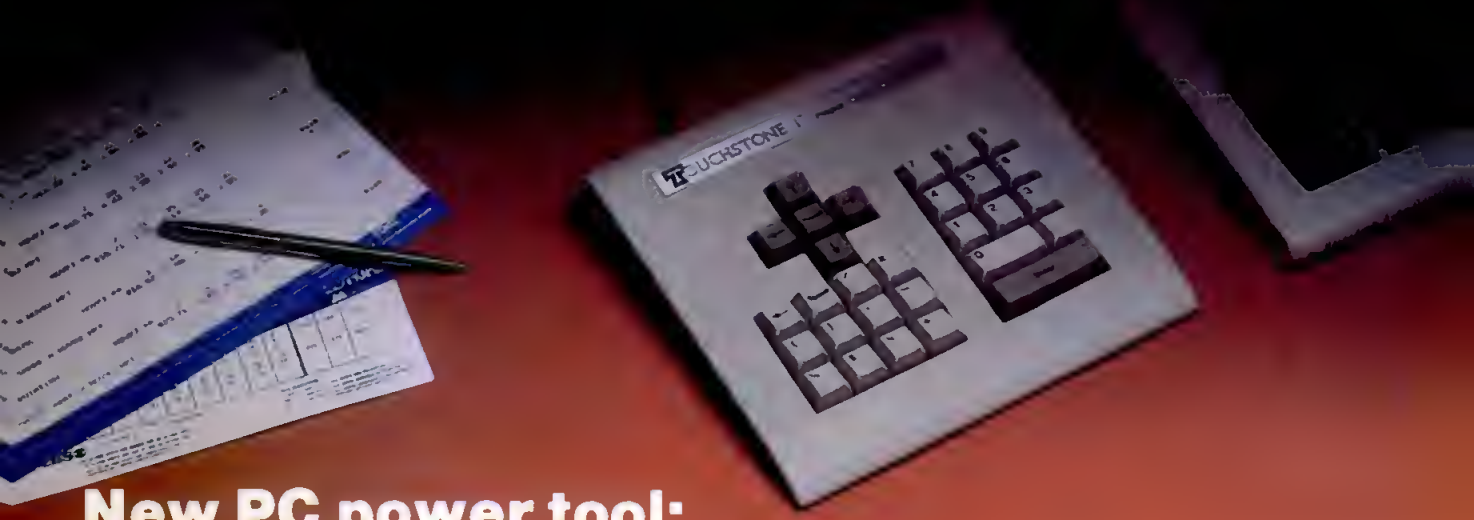

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Using the standard PC keyboard (forget the PC number pad unless you can cope with the NUMLOCK), this formula takes 37 keystrokes including 6 shifts, and hand movement totalling 137 inches. With the Touchstone 1 keypad, the same formula is entered with 31 strokes, including NO shifts, and total hand movement of just 57 inches.

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bly language gives you.

We're not talking about the simple use of assembly language subroutines to accomplish things that you can't do in a high-level language, but about gaining at least some control over the level of support that a high-level language gives you. Eliminating support that you don't need can free your program of all kinds of flabby bulk.

There are, depending on how you count them, from two to four ways that compilers add potentially unnecessary support to programs. The first, and one of the most important, is in what is called the prologue, the start-up code that is performed before the program gets down to carrying out the actual instructions we give it.

Some prologue work is absolutely essential. Other work simply sets up the operating framework that is conventional for that particular programming language; a final part of the prologue may set up overhead for input and output that we may never need, which is where the flab lies.

More unnecessary program overhead comes from what I call too-high-level service support. For example, suppose we want to have our program respond to the keyboard in simple ways—say, we need only single-key input. Some compilers may provide enough input support subroutines to perform complex input (where the user can key in an entire line, backspace to make corrections before pressing the Enter key, and so on). In this case, the services we need are comparatively simple, but the subroutines being hauled into our program are complex, adding unneeded bulk.

All in the Name of

In addition, compilers tend to add two other kinds of bulky support (which, to some are simply extensions of those discussed already). Examples include unneeded I/O support and error handling. In cases like this, avalanches occur. Say we have a program that simply reads and writes a disk file. In order to work with a file, our compiler brings in a generalized file-handling routine that has the ability to cope with file errors. In turn, these routines may need to display error messages, so a display-output routine is brought in, along with a remarkably large set of possible error messages. What we end up with is a heck of a lot of I/O and error support subroutines that our program may not need—all in the name of safe and sound support.

We end up with enormous overhead. If, for example, you create a Pascal program with the IBM Pascal compiler (Version 1), the minimum program size is 18,610 bytes—and that's for a do-nothing program. However, if you dig into the inner workings of a Pascal program, you'll discover that 16,914 bytes or 91 percent of the error-handling and I/O support is completely unused. In short, this compiler produces programs with over 16K of flab.

> Choosing a language like BASIC is like wrapping yourself in a security blanket of support and high-level services.

Although program size doesn't always matter, we ought to have a choice.

Since I've been researching this matter, I've come up with some both remarkable results and useful tips on how to control the flab in your programs. We'll cover that in the next issue. Meanwhile, I'd like to pass along a tip for hard disk users.

Hard Disk Solutions

If you are a hard disk user, do you ever have trouble remembering where you've put some of your files? Do you sometimes wonder whether you have two copies of certain files stored in different directories? I've found two solutions to the problem of hard disk disorganization, one clumsy and one tidy.

The clumsy one is to let the DOS command CHKDSK generate a list of all the files on your disk and then use your editor or word processor to search for the wanted filenames. If you use the /V option of CHKDSK, CHKDSK will, among other things, display the files on your disk. Then simply redirect that display into a file and your word processor or the DOS FIND command can search for what you want.

If, for example, the file you're looking for is named XXX, type

```
CHKDSK C: /V FIND [] ''XXX''
 MORE []
```

Unfortunately, this method is painfully slow; it takes over 2 minutes on my hard disk.

A better solution, called *WHERE*, can help you. The *WHERE* program works much like the DOS command DIR, but it searches through every directory for the file you ask for, which means you'll find every copy, no matter where it's hiding. This handy program is sold for $19.95 by King Programming Products, P.O. Box 432, Wood Dale, IL 60191.

If you don't have a hard disk, you may be suffering from hard disk envy. Buying an XT is the high-priced solution. I've tried out several less-expensive add-on hard disks and generally found them wonderful.

My favorite is Maynard's internal hard disk. It spares you the nuisance of another box on your desk, and, best of all, it runs off even the low-grade power supply found in old PCs like mine.

These hard disk add-ons are much cheaper than IBM expansion boxes. The Maynard, for example, is under $1,000, and others are comparably priced. If you have XT-envy, go for them. ■

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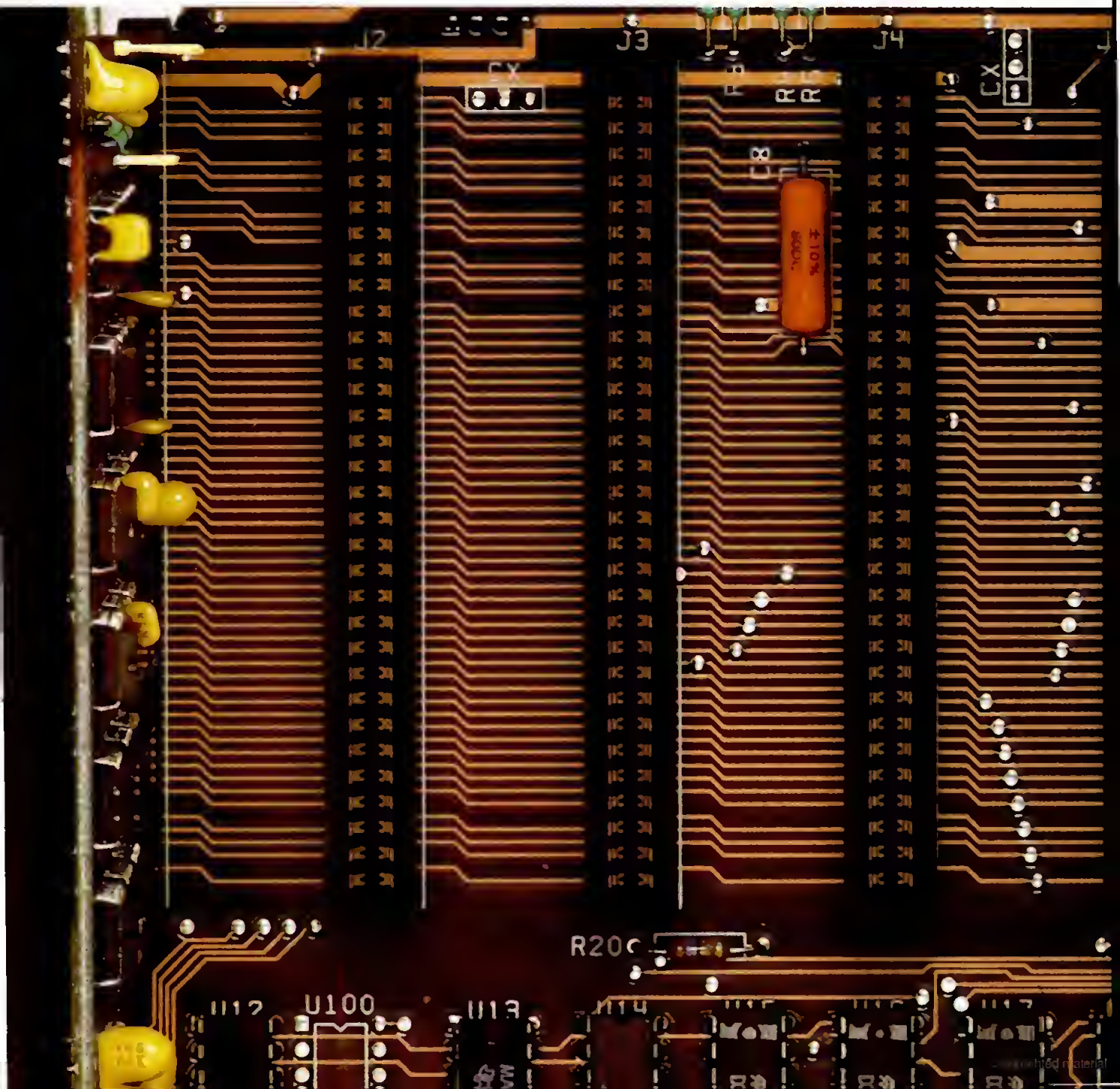

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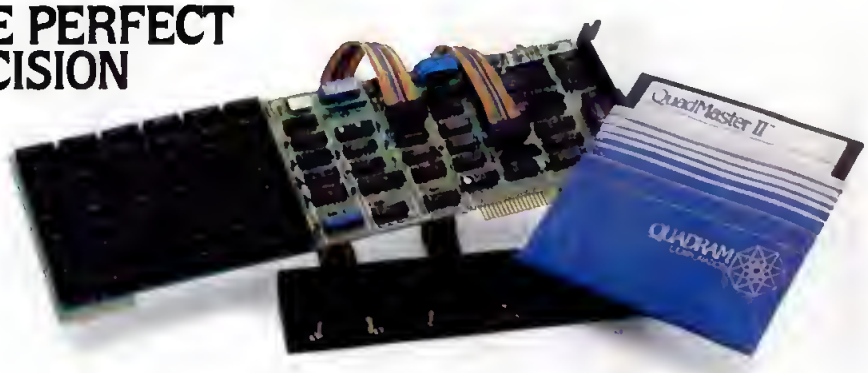

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CIRCLE 203 ON READER SERVICE CARD

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As office automation flourished, some computers became dedicated to word processing. Processors of words (formerly called typists) became very fast. And very efficient.

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The advantages of Local Area Networks (LANs) are well known. Existing personal computers can be tied together to share information and expensive peripherals such as disks and printers.

Now AST makes networking easier and more economical than ever before. With AST-PCnet II, you simply insert the PCnet II board into an I/O slot in your IBM PC or XT. Then connect the PCnet II "twisted-pair" cable to the main network cable using a standard modular "telephone jack."

The same kind of jack that's used on your telephone. To move your PC from one point to another on the network, simply plug in at the desired location. It's that easy.

With AST-PCnet II, anywhere from 2 to 160 PCs can be interconnected. Standard PC-DOS commands are used to access remote drives and printers. And dedicated file and print servers are not required, because shared PCs also function as standard workstations.

We're AST, the world's leader in communications and enhancement products for the IBM PC. To find out how AST-PCnet II can expand your IBM PCs and XTs into a reliable, versatile LAN, call or write AST Research, 2121 Alton Avenue, Irvine, California 92714. (714) 863-1333. TWX: 753699ASTR UR

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AST-PCnet II Local Area Network

CIRCLE 104 ON READER SERVICE CARD

Thinking of buying a modem? Inside You owe it to yourself to check

PC212A/1200 Includes Modem Card, PC-TALK III software, card edge guide, modular phone cable, quick reference card, and instruction manual **$299**
Optional external serial port connector **$20.**

Just a few years ago, computers needed big air-conditioned rooms to operate in, balefuls of money to buy, and a team of wizards to keep them running. The constant march of technological progress has given more and more powerful machines which cost less and less. Desktop computers more powerful than the early mainframe computers are the result of the evolution. The Qubie' modems represent the latest extension of this progress. Because up until now, a 212A compatible modem cost at least $500. Through the use of four low-cost, state of the art microprocessors, we can now offer two versions of our full featured 212A modem at prices the competition sells 300 baud modems for.

In The Beginning

In September of 1983 we introduced the first 212A modem card for the IBM PC available for under $300. The PC212A/1200 is a complete communications package including PC-TALK III software, modular phone cable, card edge guide, and instruction manual. The modem is an auto-dial, auto-answer type, which uses all the Hayes software commands so it can be used with any of the popular software packages including Crosstalk,™ and Smartcom.™

We picked the best software package we could find based on it's ease of use and features, PC-TALK III. Our modem includes features the old industry standard missed out on. Like being able to fit in one slot in a Portable PC or PC/XT. Or an optional connector to use the modem's serial port when not using the modem. Of course the topper is the $299 price, hundreds less than the competition.

Our standalone modem, the 212E/1200 can be used with any computer or terminal with a RS-232C serial port. You can use any Hayes compatible communications software on anything from an Apple to a Zenith. Many owners of IBM PC's are using it because they lack available expansion slots, or have more than one computer they want to use their modem with.

It's attractive gold anodized case houses seven status lights (who says low prices means a shortage of features). It fits comfortably under a standard telephone. It is also a 212A compatible auto-dial, auto-answer modem which supports all Hayes software commands. Even the switch settings are the same, so any software giving recommended switch settings for a Hayes modem can be used, without knowing

Outsi

out the Qubie' 212A modems.

212E/1200 Includes: Standalone modem with cable (specify male or female), modular phone cable, and instruction manual. **$329.**

what the switches do. There is a volume control knob for easy adjustment of the speaker's output. Included in the package is modular phone cable, a cable to hook it to your computer or terminal, and instruction manual. Choose the communications package right for your needs, and you're ready to go!

Four Hearts

The heart of the Qubie' modems are four digital signal microprocessors. Two handle sending, and two do the receiving. Rather than attempt to filter all but the relevant tones used for modem communications, the microprocessors measure the tones digitally. This allows them to overcome line noise and static better than analog filter based modems.

Why Buy From Qubie'

Because you will get a product as good or better than any available, pay less for it, and get factory direct help if you need it. If at any time during the one year warranty period your modem should require service, we will fix it or replace it within 48 hours. Notice also there are no hidden charges in our prices. No extra for freight, insurance, credit cards, or COD fees. In a hurry? UPS 2nd day air service is just $5 extra. If you are like many who say, "Nah, it's too good to be true," just apply the acid test and find out. Then you will be asking yourself, "Why should I pay what these modems used to cost?"

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Qubie' gives you a 30 day satisfaction guarantee on your modem. If you are not completely satisfied we will refund the entire amount of your purchase including the postage to return it. If you can, get anyone selling another modem to give you the same guarantee. Buy both, and return the one you don't like. We know which one you will keep.

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CIRCLE 227 ON READER SERVICE CARD

We called in 19 of the most popular PC word processors for a command performance. All knew their lines, but we've separated the stars from the understudies.

THE ON WORD

The number of word processing systems on the market today is staggering. Any businessperson, writer, or home computer user who wants to purchase a program for producing reports, articles, or letters must wade through a bewildering flood of software that ranges from extremely simple, menu-driven word processors to complex systems that are practically programming languages in themselves.

To help our readers sort through this cornucopia of word processing software, we gathered and extensively tested 19 of the most popular programs on the market today.

As you can readily see as you look through the following pages, we have not simply reviewed each software package on its own individual merits. Instead, we established 13 separate word process-

WORD PROCESSORS

ing functions that we felt should be included with any usable word processor: loading the file, calling up help screens, entering data, adaptation to the IBM PC, text adjustment, search and replace, block moves, paragraph formatting, saving the file, printing the file, error handling, exiting the program, and "Bells and Whistles," a section that also includes the writers' opinions of the software.

Each of the ten writers chosen to participate in the project was given a somewhat altered version of the Gettysburg address in an ASCII file labeled GETTYSBU.RG. He or she was instructed to use the assigned software to edit and reformat the file. In order to ensure that each program was tested following exactly the same criteria, the writers were given a "script"—a precise list of instructions to follow that would test the capabilities of each word processing package.

The following pages will examine exactly how these functions operate with each word processor. We begin each section with a short explanation of what we asked the reviewers to do. Each reviewer explains how that particular function was performed with each word processor.

On each opposing page is a chart that breaks down each of these word processing functions even further, so that you can easily discover the capabilities and limits of each system.

We hope that the following information will make it easier for you to break through the chaos and discover what you can expect from a word processor and which of the packages reviewed here is most likely to suit your needs.—**Barbara Krasnoff**

Note: The names of our ten reviewers appear with the product IDs in the sidebar at the end of the article.

LOADING THE FILE

Start up the word processor. Load in the ASCII file called GETTYSBU.RG. If the word processor objects to the name, change it. If the product cannot edit ASCII files, try to alter it so that it is acceptable.

☐ Bank Street Writer

After showing the logo and copyright, the screen appears ready for writing. To load an existing file, press Esc to bring up the Edit mode, select Retrieve from the command menu, and the file comes up (minus its extension).

☐ EasyWriter II

EasyWriter II loads automatically and displays a nine-item main menu that offers you options to edit a document, open a "file folder," delete a document, print, paginate (reformat) a document, set the date (*EasyWriter II* is oblivious to the DOS system date), print a document list, access system functions, and access extended functions (such as the optional *EasyMailer II*). The file folder—a single DOS file containing as many as 100 documents—is the heart of *EasyWriter II*. (Each document would be a separate file in most other systems.) The menu for each file folder offers a line of information about each of the first 12 documents, with document number, a 30-character document description, number of pages, author's initials, operator's initials, document creation date, and update date. To see the 88 other possible documents, the user must print the document list (a main menu option).

To edit a document, first open a file folder and then choose the Edit option and pick a document number, which brings an existing document on-screen or creates a new document. An ASCII file created outside *EasyWriter II* must first be imported. (Import is one of the system functions.) The ASCII file is read in as formatted, but it is stripped of carriage returns.

☐ FinalWord

The program is started by typing FW at the DOS prompt and hitting the Enter key. It loads in about 7 seconds. Initial start-up immediately puts you back into the document you were working on when you last exited the program, with the cursor exactly where it was at the end of that session.

To load in the ASCII file hit Ctrl-F4, which is the FIND FILE command. *FinalWord* will prompt you to enter a filename, and the file will be read into a buffer. An alternative is to call up a disk directory, put the cursor under the name of the file you want to edit, and hit F (for Find).

☐ Leading Edge

An ASCII file is loaded by choosing the Utilities option from the main menu and then choosing the Convert from ASCII option. *Leading Edge* asks for the name of the ASCII file and the name you want to use. Go into the program. You are asked to choose your "folder," each of which has its own format. When you pick your folder, the program displays the files in that folder, and you can use the arrow keys to choose the file you want.

☐ Microsoft Word

Word can be started by typing WORD from DOS with an optional filename (to continue editing an existing file) in an optional switch (/L, /C, or /H). Switch /L starts *Word* immediately with the last document loaded. Switch /C starts *Word* with color instead of high-resolution monochrome graphics. Switch /H starts up with a 90-character by 43-line display if the computer is equipped with a Hercules GraphicsCard.

To load GETTYSBU.RG, select in sequence (either manually or with the mouse) the commands TRANSFER, FILE, and LOAD and answer the prompt for a filename.

☐ MultiMate

To load an ASCII file, insert the Utility disk and type FILECONV at the prompt to get a menu of file conversions. You then follow simple prompts. You bring up the main menu by typing WP and hitting 1 and the Return key—this brings up a summary screen of all files on the disk. Type in which file you want, hit F10, and the file appears.

☐ Palantir

The start-up screen shows a menu of the major functions for editing, saving, printing, and help. It also shows the status of the disk drives and the currently edited file.

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BANK STREET WRITER

The editing screen for *Bank Street Writer*. Functions are chosen by moving the highlight through the command line on top.

Program	Does Help supplant manual?	On-line Help facility?	Text file of information?	Adjustable amount of help?
BANK STREET WRITER	YES	Yes, limited	NO	NO
EASYWRITER II	Somewhat	YES	YES	NO
FINALWORD	NO	YES	NO	YES
LEADING EDGE	Yes, after installation	YES	YES	NO
MICROSOFT WORD	YES	YES	YES	YES
MULTIMATE	YES	YES	NO	YES
PALANTIR	NO	YES	NO	YES
PC-WRITE	NO	YES	NO	NO
PERFECT WRITER	YES	YES	YES	YES
PFS:WRITE	YES	YES	YES	NO
READIWRITER	NO	YES	NO	NO
SAMNA WORD III	YES	YES	YES	YES
SELECT BILINGUAL	YES	YES	NO	NO
SPELLBINDER	YES	YES	YES	NO
VOLKSWRITER	NO	Yes, minimal	NO	YES
WORDMARC	NO	No, but good prompting	NO	YES
WORDPERFECT	YES	YES	YES	YES
WORDSTAR	YES	YES	YES	YES
XYWRITE II-PLUS	NO	YES	YES	NO

Bring up on the screen any initial help information, including a directory of the diskette, if possible.

☐ Bank Street Writer

Most users will be able to use *Bank Street Writer* without referring to the manual at all. Alt-K brings up an on-screen drawing of the most frequently used keys, but the program is so simple that help is usually not necessary.

☐ EasyWriter II

F2 provides help on the menu choices. Once at the Help screen, pressing almost any valid *EasyWriter II* command key displays an explanation of what the key does. Most commands use the function keys, either alone or with the Shift or Alt key depressed.

EasyWriter II accepts any filename but can't follow a DOS 2.0/2.1 subdirectory path. You have to know the filename before starting, since there's no way to get a directory of a disk. This is a recurring problem: In situations where you need to call or work with another document, *EasyWriter II* should but can't list available documents.

☐ FinalWord

FinalWord offers general help information. Help is called up in connection with a specific command about which you may need more information. A disk directory can be called up by pressing Ctrl-F2, specifying the drive, and pressing the Enter key.

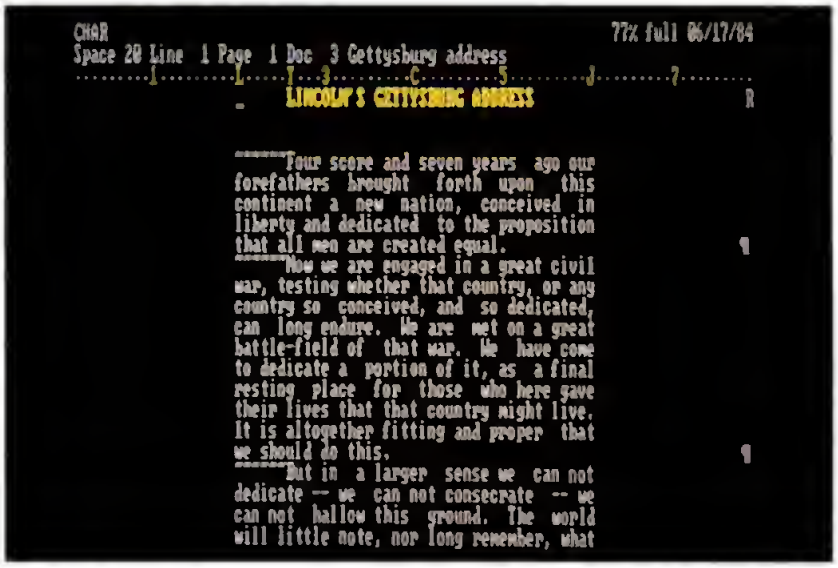
☐ Leading Edge

To call the on-line Help facility, you hit F1 followed by the key assignment you want more information on.

☐ Microsoft Word

All normal functions are well documented on-line. Available commands are always listed in the four-line command area at the bottom of the screen. Help is available at key level. Whenever input is needed, you can type H or place the mouse arrow over a question mark to generate help for that entry or for any other operation.

EASYWRITER II



The editing screen for *Easywriter II*. Each document is contained in a DOS "file folder" that includes as many as 100 documents.

☐ MultiMate

It would be possible to learn *MultiMate* by following its logical organization and by using the Help facility, which is called up by pressing Shift-F1. To learn about a specific function, press that key while in Help mode.

To bring up a summary screen of all files on the data disk, select the EDIT, CREATE, or PRINT utilities from the main menu and press the Return key.

☐ Palantir

To call up the Help menu, you type H from the main menu. However, even if you study the help screens, you'll probably have to use the manual often.

☐ PC-Write

When you press F1 for help, you get a screen that lists all of the commands. First you see a brief summary of all the major commands. Then, by pressing the right-arrow key, you can call up more extensive paragraphs telling you, for example, how to move a block of copy. There is no way, however, to read the Help menu while editing, and finding precise information takes a bit more reading than usual.

To see a directory of files, you must type DIR while in DOS.

☐ Perfect Writer

On-screen help is available at any point in the program. Strike Esc to toggle the main menu on and off and proceed through the menu chain until the desired function is found. Place the highlighted bar over the item and type a question mark. A description of the function appears. Hit Esc again to return to editing.

For a disk directory listing, choose the Directory function for the Document submenu and specify the drive.

☐ PFS:WRITE

If you need help at any time, press F1. At the main menu, the Help screen explains the six menu options. While entering text, the Help screen explains the 10 function keys that control editing commands. Pressing F10 dissolves the Help screen and returns you to what you were doing. The amount of help that's given is fixed at one screenful.

☐ ReadiWriter

Pressing F1 gives you a screenful of help information, most of it concerning *ReadiWriter*'s key usage. However, help information won't be necessary once you know the program.

(continues on page 151)

Program	Imports standard ASCII files?	Restrictions on filespecs?	Name extension refers to file type?	Can specify a DOS subdirectory?
BANK STREET WRITER	YES	No provision for extensions	No provision for extensions	NO
EASYWRITER II	YES	NO	NO	NO
FINALWORD	YES	Yes for .F$$ extension	.F$$ for intermediate printing file	YES
LEADING EDGE	YES	Only extension is .DOC	Yes, uses .DOC extension	NO
MICROSOFT WORD	YES	Default extension of .DOC	Yes, uses .DOC extension	YES
MULTIMATE	YES	Only extension is .DOC	Yes, uses .DOC extension	NO
PALANTIR	YES	Uses .WP extension	Uses .WP extension	NO
PC-WRITE	YES	NO	NO	YES
PERFECT WRITER	YES	Yes, for some extensions	MSS for text DAT for data BAK for backup	NO
PFS:WRITE	YES	NO	NO	NO
READIWRITER	YES	NO	NO	NO
SAMNA WORD III	YES	Yes, for some extensions	IDX for index file, .OVX for disk initialization file	YES
SELECT BILINGUAL	YES	Can't use .BAK, .SEL, .TTY, .SPL, $$0, $$1, $$2	NO	NO
SPELLBINDER	YES	NO	NO	NO
VOLKSWRITER	YES	Yes, for some extensions	FMT=Format BAK=Backup	YES
WORDMARC	YES	NO	NO	YES
WORDPERFECT	YES	NO	NO	YES
WORDSTAR	YES	.BAK reserved for Backup	.BAK reserved for Backup	NO
XYWRITE II-PLUS	YES	NO	NO	NO

Briefly describe the initial edit screen. Position yourself at the end of the file and enter: "4 score and seven years ago our forefathers brought forth upon this continent a new nation, conceived in liberty and dedicated to the proposition that all people are created equal."

☐ Bank Street Writer

There is a 5- by 8-inch box in which the copy stands. Above this box are two function lines. Below it is a status line that gives information such as "Data disk in drive B:" and "Press Alt-K for Keys." You choose which function you want by pressing Tab. When the function is highlighted in reverse video, you press Return.

☐ EasyWriter II

EasyWriter II divides documents into pages, or what will eventually become pages in the finished product, of up to about 4,000 characters each (a single-spaced, typed page has about 3,500 characters). Each *EasyWriter II* page is treated as a separate, fiercely independent fiefdom. Only with special commands can text from adjacent pages be blended together. Once in the Edit mode, the screen displays three status lines containing the document name, the cursor location, the date (if set), the percentage of the disk that is full, a ruler/tab stops line, any fonts in effect at the cursor location (such as underline, boldface, double-underline, super/subscript), and the current editing mode. Text is on the bottom 22 lines.

☐ FinalWord

FinalWord is designed to edit documents in one of 12 "buffers." These buffers are segments of a *FinalWord* program file on disk, called the SWAP file. This file can be as small as 64K or as large as 180K, depending on what other programs you choose to put on the *FinalWord* program disk and how much disk space you have. Buffers can be created and deleted without changing the size or configuration of the SWAP file. You may find that very long documents will not fit into a SWAP file buffer unless you delete some of the other buffers. The maximum length of a document you can edit is therefore something less than the size of the SWAP file, though several such documents can be chained together for printing. As you edit a document in a buffer, the changes are constantly written out to disk—a "virtual memory" scheme that protects your text should there be a power failure.

Once you have created your SWAP file, you can begin entering data. The next-to-last line of the screen is in reverse video. It contains information on the file currently being edited.

☐ Leading Edge

The editing screen contains lines on top indicating document name, page, line, column, date, time, and Insert or Overtype mode. There is also a ruler line that shows the margins. Editing is done on-screen using the function keys, Shift, Alt, and Ctrl.

☐ Microsoft Word

The initial screen includes a windowed workspace and a four-line area at the bottom for prompts, suggested responses, and help messages.

Available commands are always listed in this four-line area, and you call them by placing the mouse arrow over the command and pushing the left button or by entering the Command mode by pressing Esc. Then type the first letter of the command you want. Alternatively, the Tab and spacebars can be used to highlight commands sequentially. The command is invoked by pressing Return when a command is highlighted.

☐ MultiMate

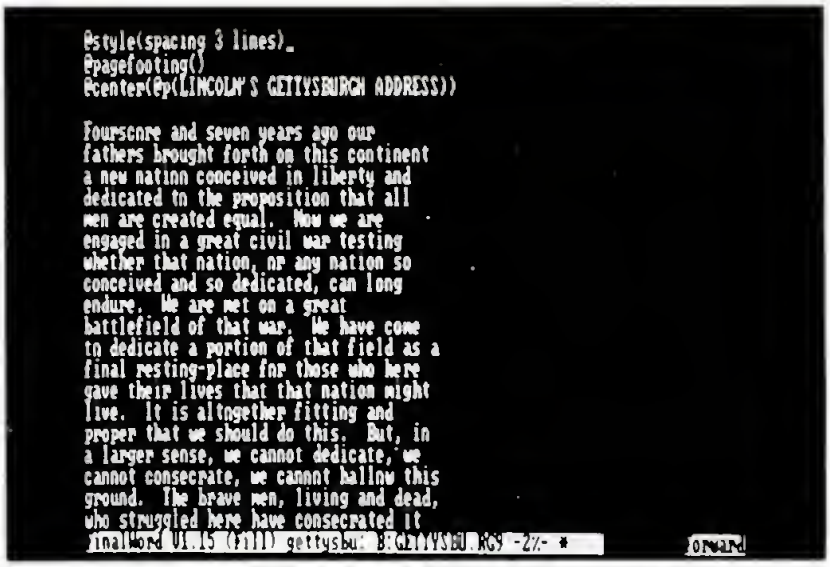
The document name, page number, line number, and column number appear at the top of the screen, along with a permanent ruler line that shows the spacing and tabs. At the bottom right, S ↓ and N ↓ indicate that CapsLock and NumLock, respectively, are off; up arrows indicate they are on. When you use a function such as Delete, a highlighted prompt appears at the top right.

☐ Palantir

The initial Edit screen is blank except for a status line and a ruler line. The status line indicates the current scrolling direction, the current page, line, and column numbers, and either the word *Change* or *Insert* to indicate data-entry mode.

(continues on page 151)

FINALWORD



The editing screen for *FinalWard*. As text is edited in a buffer, the changes are constantly being written out to disk.

Program	Edits within file?	Edits on command line?	Scrolls past right edge?	Has wordwrap?	Can toggle wordwrap option?	Maximum characters per line	How many files edited at once?	How many files viewed at once?
BANK STREET WRITER	YES	YES	NO	YES	NO	80	1	1
EASYWRITER II	YES	NO	If wide margin is set	YES	NO	255	1	1
FINALWORD	YES	Only complex commands	NO	YES	YES	80	11	2
LEADING EDGE	YES	NO	YES	YES	NO	199	2	2
MICROSOFT WORD	YES	YES	YES	YES	YES	Undefined	8	8
MULTIMATE	YES	YES	YES	YES	NO	156	1	1
PALANTIR	YES	NO	NO	YES	NO	250	1	1
PC-WRITE	NO	YES	YES	YES	YES	156	2	2
PERFECT WRITER	YES	NO	YES	YES	YES	254	7	2
PFS:WRITE	YES	NO	NO	YES	NO	78	1	1
READIWRITER	YES	YES	YES	NO	—	254	1	1
SAMNA WORD III	YES	Only complex commands	YES	YES	NO	250	2	2
SELECT BILINGUAL	YES	NO	NO	YES	NO	254	1	1
SPELLBINDER	YES	YES	NO	YES	NO	80	1	1
VOLKSWRITER	YES	NO	YES	YES	NO	250	1	1
WORDMARC	YES	Yes, for some commands	YES	YES	NO	163	1	1
WORDPERFECT	YES	NO	YES	YES	YES	Unlimited	2	1
WORDSTAR	YES	NO	YES	YES	YES	Unlimited	1	1
XYWRITE II-PLUS	YES	Only complex commands	YES	YES	NO	255	2	2

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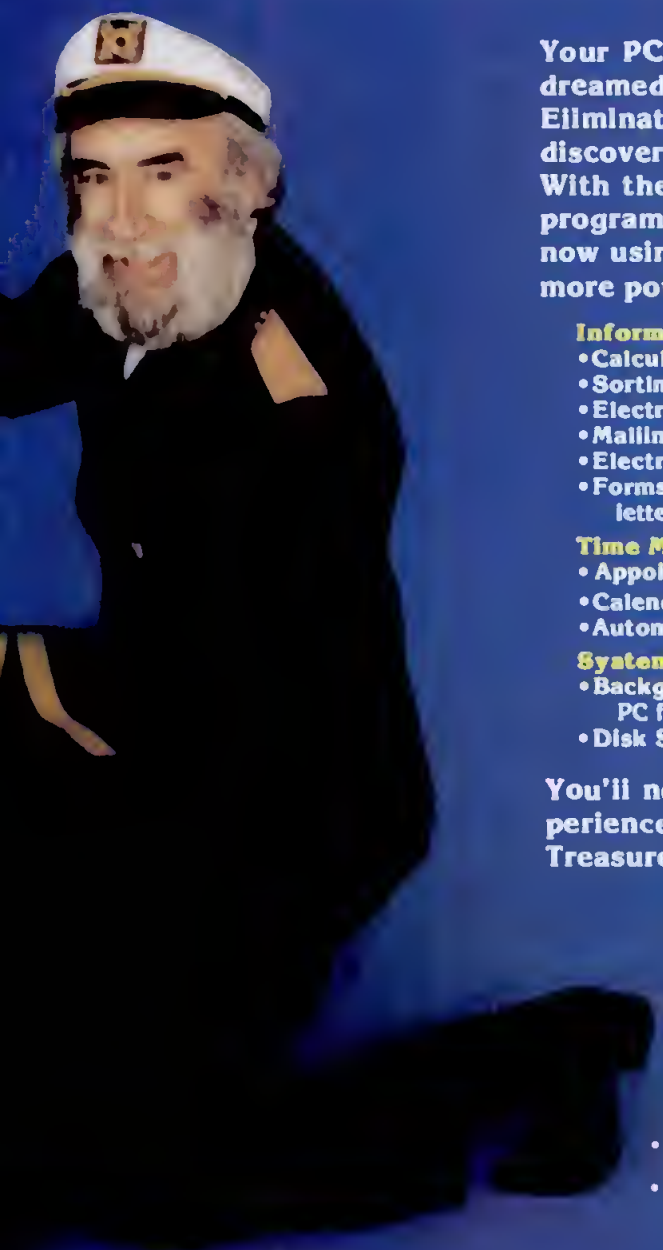

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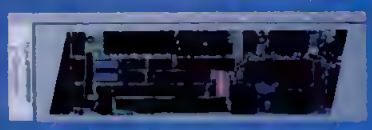

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CIRCLE 501 ON READER SERVICE CARD

Does the program make efficient use of the PC and PC keyboard? Also, if appropriate, note the program's use of color for highlighting.

☐ Bank Street Writer

None of the function keys is used, but you can program them with your own character string of up to 45 characters. The string is then automatically inserted into the text when the key is pressed. Otherwise, considering the simplicity of the program, the keys are used well.

☐ EasyWriter II

One of *EasyWriter II*'s strongest points is its use of the PC keyboard. Most every editing task is done with a function key alone or in combination with the Shift or Alt keys, the Esc key (to save text and move back to the main menu, or back up a step in submenus), the Ins and Del keys, and the cursor pad. A minor criticism: The 2- × 12-inch keyboard sticker explaining functions and fonts is arranged alphabetically, while modes are arranged in ascending function key order. Better they should both be one way or the other.

☐ FinalWord

FinalWord lets you attach any command in the entire program to virtually any key on the keyboard. You can thus establish the keystroke sequences that make the most sense to you and best allow you to run this powerful program.

☐ Leading Edge

The program makes efficient use of the keyboard. Hitting F5 leads to a submenu that allows you to choose colors for the display.

☐ Microsoft Word

The function keys, Alt key, and keypad keys are all used in a logical way. Stick-on markers are provided for special keys.

☐ MultiMate

The program is logical and easy to use. There is one "patch" to change the color of the status lines. To edit the extended character set, hold down Alt and type in the 3-digit numerical code that corresponds to the character you want.

☐ Palantir

The availability of ten function keys was taken into account early in the design phase of *Palantir*. Not only are they powerful, but they are placed in a pleasantly symmetrical and easy-to-remember way.

☐ PC-Write

My impression is that *PC-Write* is well adapted to the PC. Moving your hands on the keys is easy, for they are intelligently placed. With practice, most moves become intuitive.

Also, the function keys are assigned well—for example, F6, which is used to mark text for moving, copying, and deleting is handy to reach. You can also change any keys you like. There is a source diskette that makes this program a programmer's paradise. You can even change keys so that much of *PC-Write* will emulate your current word processor.

☐ Perfect Writer

One of *Perfect Writer*'s annoying defects is that it makes poor use of the function keys, often assigning them trivial or peculiar commands instead of complex executions that are tedious to do with the menus.

☐ PFS:WRITE

PFS:WRITE is written specifically for the PC and its clones. Everything is done by the function keys alone or in combination with the Shift key, or through the cursor pad. Although the Ctrl key is never used, some sequences do funny things to the copy, such as Ctrl-E, which deletes a line. Esc always returns you to the main menu. On a color monitor, underlined and boldfaced words are in separate colors; on the monochrome monitor, they're underlined and boldfaced.

☐ ReadiWriter

ReadiEdit, the editing subset of this word processor, is well adapted to the PC. The function keys are used well, and the functions of the control keys are related to their names.

☐ SamnaWord III

Samna gives you ten different keyboard options (including French, Spanish, and Greek) that make use of the extended ASCII set. For example, once you set the keyboard to behave like a German type-

(continues on page 159)

LEADING EDGE

The editing screen for *Leading Edge*. In order to execute a command, you must use the plus sign key rather than the Return key.

Program	Uses PC keyboard efficiently?	Uses color screen?	Colors can be tailored?	Can edit extended character set?
BANK STREET WRITER	YES	YES	NO	NO
EASYWRITER II	YES	YES	NO	NO
FINALWORD	YES	YES	NO	NO
LEADING EDGE	YES	YES	YES	NO
MICROSOFT WORD	YES	YES	YES	YES
MULTIMATE	YES	YES	Only status lines	YES
PALANTIR	YES	YES	NO	NO
PC-WRITE	YES	YES	YES	YES
PERFECT WRITER	Adequate	YES	YES	NO
PFS:WRITE	YES	YES	NO	NO
READIWRITER	YES	YES	NO	YES
SAMNA WORD III	YES	YES	YES	YES
SELECT BILINGUAL	NO	YES	NO	YES
SPELLBINDER	YES	Needs tech manual	Not easily	NO
VOLKSWRITER	YES	YES	YES	YES
WORDMARC	YES	YES	NO	YES
WORDPERFECT	YES	YES	YES	YES
WORDSTAR	YES	YES	YES	NO
XYWRITE II-PLUS	YES	YES	YES	YES

Position the cursor to the first "4" in the paragraph you added to the end of the file and replace it with *F*. Insert the word *our* after it. Center the heading of the document. Indicate to the word processor that the heading should be underlined and printed in boldface.

☐ Bank Street Writer

The cursor is positioned with the four arrow keys. Simultaneously pressing Ctrl and an arrow key moves the cursor to the beginning or end of a line. Press Home and End to get to the top and bottom of a file. Alt-C centers type, Alt-U underlines, and Alt-B boldfaces.

☐ EasyWriter II

EasyWriter II is always in the Overtype (or replace) typing mode. To insert text, pick a mode, press Ins, and *EasyWriter II* inserts blank spaces accordingly. Then type in the additional text. Extra blank space remains until you press the Adjust (paragraph reform) key (F8). Cursor movement is always possible by using the cursor keypad or by choosing a mode and hitting the Previous (F9) or Next (F10) keys. To jump between pages, choose the Page mode and Previous or Next, or Go To (F10), and a page number. When leaving a page, all changes are written to disk, and the new page is read from disk into RAM. Pressing Home in combination with a cursor key moves the cursor to the edges of the screen. PgUp and PgDn move screenfuls within a page, but not between pages. There is no easy way to go to the end of the document; if you know the number of pages, you can go to the top of the last page.

Centering is easy: Press Alt-F2. To underline press Alt-_ and to boldface (actually doublestrike), press Alt-B. Both show up on screen. The mode you are working in controls how much text is underlined or boldfaced. For example, in the Sentence mode, the whole sentence is affected.

☐ FinalWord

FinalWord uses single commands to move the cursor forward or backwards by character, word, sentence, line (at the edge of the screen), line (up or down), paragraph, or document. These commands can be bound to virtually any key you choose.

The cursor movement commands are also used to indicate text for deletion, copying, and capitalization. For example, hitting F6 moves the cursor to the end of the next sentence. Hitting F7 (which turns on the Deletion mode) and then F6 deletes the next sentence (and turns off the Deletion mode).

During the initial configuration of the program you have to choose whether highlighted text will print as boldface, italicized, or underlined type. Unfortunately, you can't get a combination of these. To highlight text as you type it, toggle the Highlight mode off and on with the F10 function key. While this mode is on, the letter H appears in the data line on the screen, and the text you type will appear underlined.

In order to highlight text that is already on screen, press the Alt-F2 key combination and then indicate the amount of text to be highlighted.

In order to make text print out both underlined and in boldface type, you would have to use one of the embedded commands and go through the advanced formatting procedures. The embedded command would look like this:

```
@p(Lincoln's Gettysburgh
Address)
```

☐ Leading Edge

The program moves the cursor to the top and bottom of files using Ctrl-Home and Ctrl-End. It can move the cursor to the beginning and end of files, left/right by word, up/down to previous/next punctuation, end of page, next page, and selected page numbers. It has five "bookmarks" that can be placed at will. To center, put cursor on line then type F6. To underline and boldface, hit F5 for Attribute submenu and mark text with cursor.

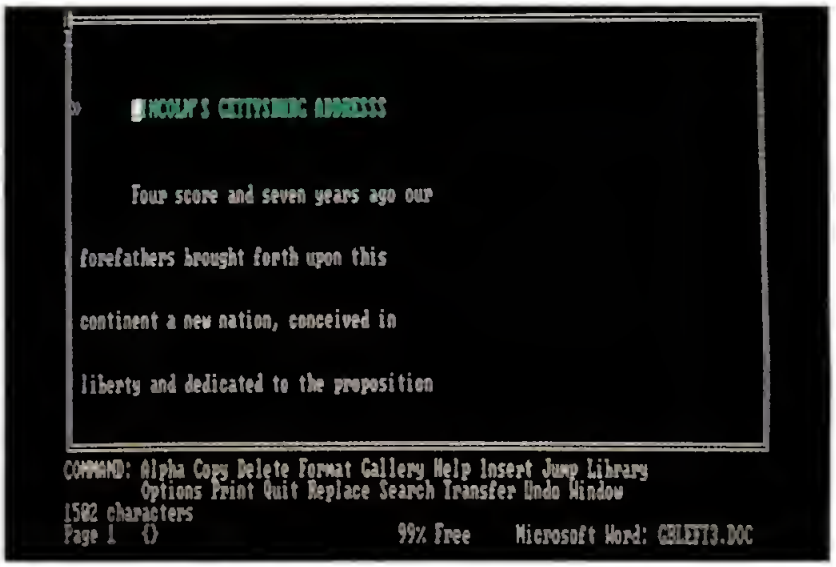
☐ Microsoft Word

Position the cursor on the 4 and type the word *four*, then forward delete to get rid of the 4. (The program will default to the Insert mode.)

Press Ctrl-PgUp to get to the top of the document and type: Lincoln's Gettysburg Address, followed by two carriage returns. To center, put the cursor on the appropriate line and hit Ctrl-C. Shift-F9

(continues on page 159)

MICROSOFT WORD



The editing screen for *Microsoft Word*. The command line can be accessed using either a mouse or the computer keyboard.

Program	Default editing mode (insert or replace)	Underlines?	Boldfaces?	Centers individual lines?	Adjusts more than one line at once?
BANK STREET WRITER	Replace	YES	YES	YES	NO
EASYWRITER II	Replace	YES	YES	YES	NO
FINALWORD	Replace or Insert	YES	YES	YES	NO
LEADING EDGE	Replace	YES	YES	YES	NO
MICROSOFT WORD	Insert	YES	YES	YES	YES
MULTIMATE	Replace or Insert	YES	YES	YES	NO
PALANTIR	Replace	YES	YES	YES	YES
PC-WRITE	Replace or Insert	YES	YES	YES	YES
PERFECT WRITER	Insert	YES	YES	YES	YES
PFS:WRITE	Replace	YES	YES	YES	NO
READIWRITER	Replace	YES	YES	YES	YES
SAMNA WORD III	Replace	YES	YES	YES	YES
SELECT BILINGUAL	Replace or Insert	YES	YES	YES	YES
SPELLBINDER	Replace	YES	YES	YES	YES
VOLKSWRITER	Replace	YES	YES	YES	NO
WORDMARC	Replace	YES	YES	YES	NO
WORDPERFECT	Insert	YES	YES	YES	YES
WORDSTAR	Insert	YES	YES	YES	NO
XYWRITE II-PLUS	Insert	YES	YES	YES	YES

PC BRAND™ HAS UNBEATABLE

C has rapidly become the language of choice for serious software developers. The language of maximum portability across the spectrum of today's personal computers. The language which will most rapidly adapt to tomorrow's machines. The companion language to Unix™, the operating system destined for predominance. Major companies such as Microsoft and Micropro know this. They have switched to C for their applications development. How ready are you for the future?

PC Brand has the complete line of today's finest professional C tools. Not just the finest compiler, but libraries for graphics and screen design, overlay linkers, and program editors acclaimed as the best of their kind. It is a complete workshop of craftsman's tools which will turn you into a C professional in a hurry; capital equipment which will pay back your investment many times over.

Take the time to read this advertisement. You are sure to see the competitive edge these products will deliver.

LATTICE C

The Preeminent 16-bit C Compiler

You can find a more economic way to learn C, but if your interest is program development, Lattice C™ is the unparalleled choice. *Byte* said "the Lattice C compiler produces remarkable code . . . outstanding in terms of both execution speed and code compactness". After reviewing nine compilers for the PC, the *PC Tech Journal* unequivocally declared Lattice C "best for software development . . . it compiles fast and produces fast programs".

Lattice C is a full implementation of Kernighan and Ritchie, not a subset, and even offers extra features such as nested comments, 39-character variable names and extra compile time checks for some of C's subtler errors. The compiler comes with a full library of I/O routines which implement under MS™-DOS most of the Unix-compatible standards described by Kernighan and Ritchie.

Lattice C runs on virtually any computer using an 8086 or 8088 microprocessor, and we carry two versions for either PC-DOS™ or CP/M-86™. Create your source files with any word processor or text editor like Edlin or our Pmate™ and Lattice C will compile them into Intel 8086 object module format ready for linking with other modules by linkers such as DOS' Link or our Plink86™.

Lattice C offers a choice of four memory models which allow the program designer to choose the right combination of efficiency and size for an application: a range between 64K and a full megabyte for program and data area size.

The documentation, which *Byte* says "sets such a high standard of excellence that others don't even come close", features sample source programs and covers the interface to assembly language and machine dependencies.

C's structured approach encourages development of tight, fail-safe functions which can be counted on to return reliable results every time. Local variables unknown outside of functions to safeguard against collision. Extremely powerful nested expressions which produce elegant, concise code.

Requires 128K RAM.

For PC-DOS: Product Code: S0100
For CP/M-86: Product Code: S0120 Our Price:
Suggested Price: **$500.00** **$295.00**

HALO

A Spectacular Graphics Extension to Lattice C

Halo™ will astound you. It provides a complete library of graphic functions which can be linked with your Lattice programs to create full-color charts, graphs, simulations, even animation.

Over 100 commands are at your disposal, including plot, line, arc, box, circle, plus single commands to produce bar graphs and pie charts. Pattern-fill and dithering commands give your graphics impressive texture and color mixes, rubber-banding draws shapes for interactive users, area moves produce animation, fill and flood commands paint areas. The newest version allows you to define your own world coordinate scheme, divide the screen into "viewports" (windows), and scale graphic figures automatically.

It's a long list of capabilities which make for an extraordinarily powerful product. In fact, Halo is so good that manufacturers of graphics boards and systems are adopting it as a standard graphics language. So it can bridge your application to other systems. CAD-CAM developers, especially, have embraced its device-independent approach for maximal portability.

Halo is a dazzling demonstration of why C has become the language of choice among programming professionals: its function library architecture means you can tremendously enhance your firepower by acquiring libraries of software like Halo with dramatic economy of time and money.

Requires IBM monochrome or color graphics card or equivalents.

Product Code: S0300 Our Price:
Suggested Price **$200.00** **$125.00**

PMATE

The Programmer's Word Processor

Pmate was designed for programmers. We'll wager that you cannot find a programmer who has discovered Pmate and moved on to something else.

Pmate is a full screen editor with ten auxiliary buffers for squirreling away pieces of text until needed. It uses single key commands to move the cursor, or text, or insert or delete, or rescue several thousand characters of deleted text.

It has a format mode for tab setting or wraparound and shaping when it's time to write documentation. Pmate lets you assign chains of commands or strings of text to single keys: one keystroke could set up the entire shell of a new C function, for example.

Pmate has variables, if-then statements, loops. It calculates, and converts decimal to hex to binary and back. You can write compact programs (called "macros") to delete comments, for example, or check syntax, or process long sequences of commands. Macros can alphabetize lists, do row and column math, perform a series of operations on multiple files, even summon other macros.

Put another way, Pmate is a text editor with its own built-in interpretive language. A language you can use to completely customize this text editor to your fancy. Possibly the most artful, ingenious program you have ever seen.

Product Code: S0600 Our Price:
Suggested Retail: **$225.00** **$175.00**

PLINK86

Overlay Linkage to Expand

Software is becoming ever more sophisticated, which means more complex programs requiring large chunks of memory. But if you use extra memory, if you count on users to have expanded RAM, you will forego sales to those who do not.

Plink86 is the answer. It takes on the job of shoe-horning large programs into small memory. First, Plink86 acts as an alternative to DOS' Link. For a language like C which encourages design of separately compiled object modules in the Microsoft relocatable format, Plink86 pulls modules together into single compiled programs. But Plink86's overlay power is what has gained it a reputation as a miracle worker. It binds into the compiled program its overlay manager which knows how to swap modules of your large linked program between disk and memory, so that each can temporarily occupy the same memory space.

Unlike other linkers, the overlay manager acts on its own, needing no calls from the source program. Instead, Plink86's straightforward overlay description language allows you to describe your overlay structure in one place in your program — a structure

VALUES FOR 'C' PROFESSIONALS

Equip Your Workbench with Our Precision Quality Craftsman™ Tools

C-FOOD SMORGASBORD

A Menu of Difficult to Prepare C Functions

C is a language of function libraries: sturdy routines which your application can effortlessly reference to get the job done. But someone has to write them. It would take months to concoct and perfect the complex and useful servings which have been prepared for you and thoroughly tested in C Food Smorgasbord™.

Decimal Arithmetic: Functions to perform operations on binary-coded decimal (BCD) numbers of up to sixteen significant digits. Includes trigonometric and logarithmic functions, powers, conversions to strings, and much more.

Level 0 I/O Functions: Enable you to perform direct I/O operations for screen, keyboard, printer, and asynchronous port with no dependence on higher I/O functions to minimize memory usage and maximize speed.

IBM™ PC BIOS Interface Access: Allows you to get at the basic I/O services in the ROM BIOS not available through the normal operating system to get and set the video mode, cursor position, color and screen attributes, keyboard shift, scrolling, printer channel and port status.

TIP, the terminal independence package: Lets you easily move programs to computers with different types of terminals.

There is a basket of delicacies beyond this brief list; a cornucopia to sample, any one of which will save valuable time and pay back far more than C-Food Smorgasbord's overall price.

Product Code: S0200
Suggested Price: **$150.00**
Our Price: **$115.00**

All products operate on the IBM PC or PC/XT under PC-DOS and require no more than 64K of RAM unless indicated.

Prices, terms and specifications subject to change without notice.

Prices do not include shipping and handling.

You may freely use these products to create software applications for re-sale without additional licenses or royalty payments, provided your applications are not wholly or substantially replications of the products themselves.

Unix TM Bell Laboratories / Lattice C and C-Food Smorgasbord TM Lattice Inc / MS TM Microsoft Inc. / Halo TM Media Cybernetics / IBM TM International Business Machines / Float87 TM Microfloat / Panel TM Roundhill Computer Systems Ltd / Plink86 and Pmate TM Phoenix Software / CP/M-86 TM Digital Research

PANEL

Are You Still Coding Hand-Made Data Entry Screens?

Designing custom screens is intricate, time-consuming, and costly. It can make you the loser in competitive bidding. It can add weeks, even months to bringing your product to market.

But not when you use Panel™. Put Panel to work and you hire a superprogrammer for the minimum wage. Telling Panel your screen design is like using a word processor. You can add, move, copy, delete, and reshape fields with single key commands. The result? Finished C program code with field descriptors, color and highlighting, input editing by type of field, help keys, and warning messages.

Panel can also create a terminal selection program customized for your application, and gives you a utility to quickly test your finished screens. It even includes a multi-key data file maintenance program which interacts with the screen you design. All the tools you need to generate code for the trickier aspects of your application, or even to create stand alone data entry and retrieval products without *any* programming.

Panel routines are powerful. Unlike so many programs which make error correction difficult once a field is departed, Panel gives the user full field-to-field movement for editing, and overtype or insert/delete within fields.

A truly superior productivity tool every developer should have.

Product Code: S0400
Suggested Price. **$295.00**
Our Price. **$235.00**

Your Art of the Possible

permitting up to 4,095 overlays stacked 32 deep. And you don't have to re-compile to re-arrange the structure.

Plink86 is a two pass linkage editor. On the first reading it determines all modules which need loading, to insure greater flexibility in assigning memory segment addresses before the disk file is created on the second pass. It can even sub-divide its linked output into multiple files for programs which must span more than one disk.

But most of all it sets you free to write the comprehensive code today's users have come to expect without sacrifices to memory constraints.

Product Code: S0500
Suggested Price: **$395.00**
Our Price: **$315.00**

FLOAT-87

Software Support for the 8087 Math Chip

Float-87™ is a library of floating-point math routines which are merged into a Lattice C interface library. The routines handle all arithmetic functions and the most frequently used transcendental or trigonometric functions, and pass all numbers to the 8087 to take advantage of its 80-bit data format.

Putting Float-87 to work with an 8087 can increase the speed of floating-point calculations by 40 times or more — and with greatly expanded accuracy. If you or your customers have an Intel 8087 math processor chip on board, this software will switch on its afterburners.

Product Code: S0700
Suggested Retail: **$125.00**
Our Price: **$100.00**

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Change the last occurrence of the word *people* to *men*. Change all occurrences of *country* throughout the text to *nation* in the quickest way possible. (Note that the word *country* begins with a capital letter in one instance.) Go back to the top of the file and change the title "Lincoln's Gettysburg Address" to all uppercase; use a special subcommand for that purpose if there is one.

☐ Bank Street Writer

Move highlight to the REPLACE command and press the Return key. Answer yes or no (Y or N) to the screen queries "Replace everywhere without asking?" and "Match upper/lower case exactly?" *BSW* handles only one job at a time; after a task is completed, the program shuttles you back to the Edit screen, and you must select REPLACE again.

☐ EasyWriter II

Strings of up to 50 characters can be searched for and replaced (one-by-one or globally) by using the Shift-F9 key combination. An Ignore-case (I) option finds both *country* and *Country*. (A Preserve-case [P] option replaces them with *nation* or *Nation* as needed.) The Previous and Next keys direct the search backward and forward, respectively. But the global option searches only the current page. A separate step is required to cross page boundaries and continue the search.

☐ FinalWord

The search and replace routine is executed from the front of a document to the back. To replace all references to the word *country* with the word *nation*, press Ctrl-Home to get to the beginning of the document and the Alt-F2 to invoke the SEARCH AND REPLACE command. The program will prompt you for the search string and remind you to indicate the end of the string by pressing the Esc key rather than the Enter key. Type COUNTRY and press the Esc key. The program will then prompt you for the replacement string. Type NATION and press the Esc key. The search and replace operation will proceed. In this case, the capitalized occurrence of the letter *c* in *Country* will be replaced with a lowercase *n* in *nation*.

To change the title of Lincoln's address to all uppercase letters, press Ctrl-Home to return to the beginning of the document. Then press Alt-F5 to effect the Capitalization mode. Pressing the End key indicates that one full line on the screen is to be capitalized.

☐ Leading Edge

Press the F7 key, enter the character string, and then press Shift-F7 to enter the replacement string. If you press the plus sign (+) key after the first change, the program will then ask you to verify each of your indicated changes. Pressing Shift-F7 will institute a global search and replace routine. Alt-C will tell the program to ignore case when searching for the letter *c*.

☐ Microsoft Word

Press the Esc key to enter the Command mode and the S key to invoke the SEARCH command. Answer the prompt "Search for" by typing COUNTRY and "Replace with" by typing NATION. Since "no-stop" (global change) is the default, press the Enter key. *Microsoft Word* will automatically recognize the one instance where the letter *c* is capitalized in *country*.

Return to the top of the document by pressing Ctrl-PgUp and overtype "Lincoln's Gettysburg Address" with all capital letters. (*Word* has no case-convert command.)

☐ MultiMate

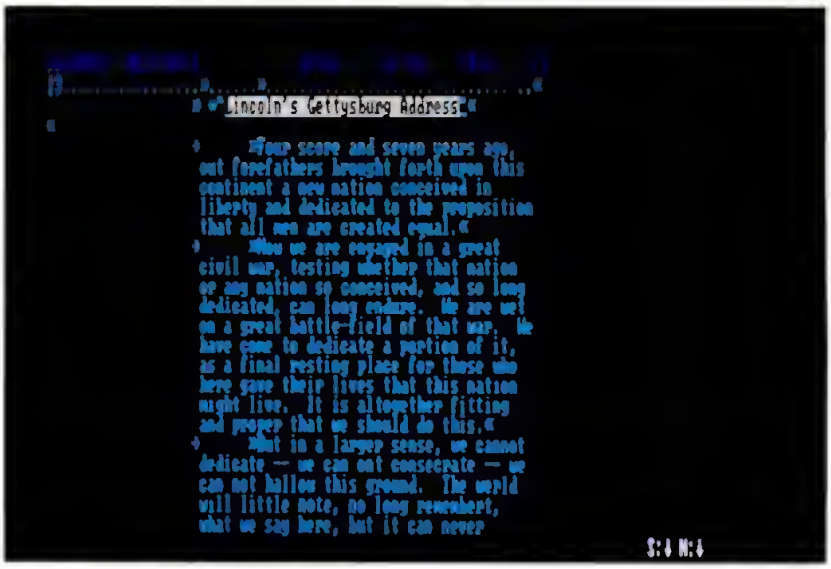
Choose either the Discretionary Replace or Global Replace options. If you choose the former, the blinking cursor will appear at the string to be changed. After each character string is identified, type yes or no (Y or N) to instruct the program whether or not to make the change. *MultiMate* automatically ignores case, but you can press Alt-G to make the system discriminate between cases.

☐ Palantir

To start the search process, press the F1 key (to set parameter), then the F5 key (to indicate that what you're setting is the Find parameter). *Palantir* prompts you for a search string and for an optional replacement string. If the search string is found, you're asked whether you want the

(continues on page 161)

MULTIMATE



The editing screen for *MultiMate*. The arrows at bottom right indicate that the CapsLock and NumLock are off.

Program	Does search and replace?	Makes change on more than one line?	Repeats change on one line?	Asks whether to make changes?	Makes all changes automatically?	Can ignore case?	Can change case?
BANK STREET WRITER	YES	YES	YES	YES	YES	YES	NO
EASYWRITER II	YES	YES	YES	YES	YES	YES	NO
FINALWORD	YES	YES	YES	YES	YES	YES	YES
LEADING EDGE	YES	YES	YES	YES	YES	YES	YES
MICROSOFT WORD	YES	YES	YES	YES	YES	YES	YES
MULTIMATE	YES	YES	YES	YES	YES	YES	NO
PALANTIR	YES	YES	YES	YES	YES	YES	NO
PC-WRITE	YES	YES	YES	YES	YES	Only lower to upper case	YES
PERFECT WRITER	YES	YES	YES	YES	YES	YES	YES
PFS:WRITE	YES	YES	YES	YES	YES	Always ignores case	NO
READIWRITER	NO	—	—	—	—	—	—
SAMNA WORD III	YES	YES	YES	YES	YES	YES	YES
SELECT BILINGUAL	YES	YES	YES	YES	YES	Always ignores case	NO
SPELLBINDER	YES	YES	YES	YES	YES	YES	NO
VOLKSWRITER	YES	YES	YES	YES	YES	NO	NO
WORDMARC	YES	YES	YES	YES	YES	YES	NO
WORDPERFECT	YES	YES	YES	YES	YES	YES	YES
WORDSTAR	YES	YES	YES	YES	YES	YES	NO
XYWRITE II-PLUS	YES	YES	YES	YES	YES	YES	YES

Move the last paragraph in front of the first paragraph of the file. Reverse the order of the second and third sentences in what is now the last paragraph.

☐ Bank Street Writer

Move from Writing mode to Editing mode by pressing Esc. Choose COPY by pressing the Tab key. Press Return. Follow the prompts (for example, "Place cursor at beginning of text to be copied, then press Return") to define the block, which will appear in inverse video. The next prompt is to "Move cursor to the desired text location, then press Return." You are then asked "Do you want the highlighted text copied in this location (Y/N)?" Follow the same procedure for MOVE and DELETE. For DELETE, there is also a safeguard: "Are you certain you want to make this deletion?"

☐ EasyWriter II

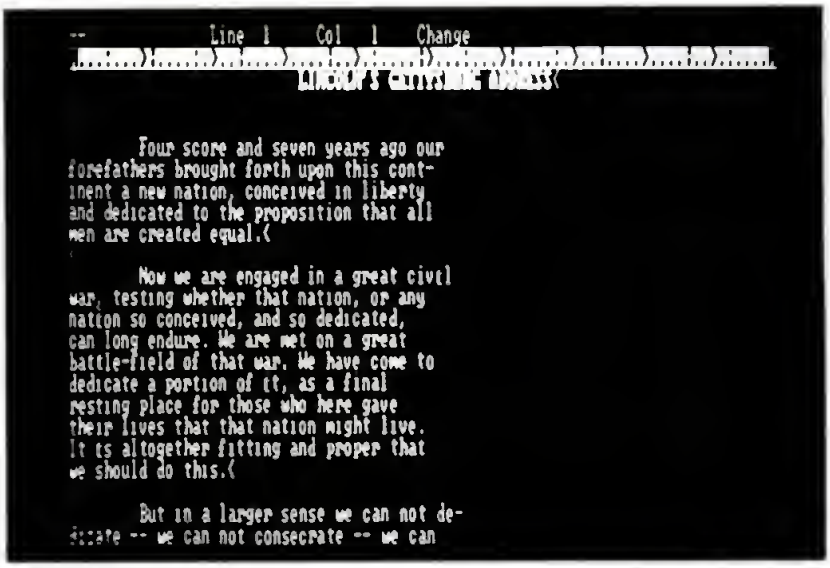
As long as a block of type doesn't exceed the 4,000-character-per-page limit, block moves are easy. Shift-F6 is the Block mode, but other modes work well, too, especially the Sentence and Paragraph modes. Combinations of CUT (Alt-F3), COPY (Alt-F4), PASTE (Alt-F5), and DELETE (Del) commands soon become second-nature. Screw-ups can be undone by the CANCEL (Shift-F2) command and won't undo other changes to the page. TAG (Alt-F7) and MERGE (Alt-F8) allow shipping of blocks between documents. The program doesn't take advantage of the PC's highlighting and inverse video abilities to distinguish blocks.

☐ FinalWord

Block moves are accomplished with a delete/undelete sequence as follows. Hit Ctrl-End to move to the end of the document. Hit F7 to turn on the Delete mode, and hit Ctrl-PgUp to indicate the previous paragraph. The paragraph will disappear. Hit Ctrl-Home to move to the beginning of the document, hit the down arrow key three times (to get past the title of the document in this case), and hit F8 (undelete). The previously deleted paragraph now appears after the cursor.

To reverse the order of the second and third sentences in the last paragraph, hit Ctrl-End to get to the end of the document. Hit F7 to turn on Delete mode, and hit F5 to indicate that the previous sentence is to be deleted. The sentence will disappear. Hit F5 again to move the cursor to the beginning of the previous sentence and hit F8 (undelete). The previously deleted sentence will appear after the cursor.

PALANTIR



The editing screen for *Palantir*. The PC's ten function keys are well utilized, and selected functions are highlighted in reverse video.

☐ Leading Edge

Moving a block is a cut-and-paste operation. Mark the beginning of the block with the appropriate function key, move to the end of the block, and hit +. The block will disappear. To paste, position the cursor at the new location and hit F10.

☐ Microsoft Word

I used the mouse to scroll down by placing it on the left window border and hitting the left button several times. Then I positioned the mouse on the last paragraph and hit the right button to SELECT the entire paragraph.

While holding down the Ctrl key, I moved the mouse to the beginning of the text. When I released the Ctrl key, the last paragraph had been moved to the beginning of the text.

I repeated the above procedure to swap the second and third sentences in the last paragraph.

☐ MultiMate

To copy, press F8. The prompt "Copy what?" appears at the top of status line. Identify the block by moving the cursor (Alt-F8 to define a paragraph, Alt-F7 to define a sentence). The defined block will be highlighted. Press F8 again, and prompt asks "Copy where?" Move the cursor to the new location and press F8 again. To move, press F7. To delete, press the Del key, and a prompt will ask "Delete what?" Highlight the text to be deleted and press Del again. DEL PERIOD will delete a sentence to the period.

☐ Palantir

To define the block to be moved, position the cursor at the beginning and press F1 (the Set key) and then hit B (for Block). Position the cursor at the end of the block and press Return. *Palantir* then asks you whether you want to move or copy the block, to which you reply M or C. Then move the cursor to the new location and press F1 and M. This procedure works

Program	Copies groups of lines?	Moves groups of lines?	Deletes groups of lines?	Copies individual words or sentences?	Copies columns?	Copies and moves between files?	Writes into another file?	Reads into another file?
BANK STREET WRITER	YES	YES	YES	YES	NO	YES	YES	NO
EASYWRITER II	YES	YES	YES	YES	NO	YES	NO	YES
FINALWORD	YES	YES	YES	YES	NO	YES	YES	YES
LEADING EDGE	YES	YES	YES	YES	NO	YES	YES	YES
MICROSOFT WORD	YES	YES	YES	YES	YES	YES	YES	YES
MULTIMATE	YES	YES	YES	YES	YES	YES	Yes, but not easily	Yes, but not easily
PALANTIR	YES	YES	YES	YES	NO	YES	NO	YES
PC-WRITE	YES	YES	YES	YES	NO	YES	YES	YES
PERFECT WRITER	YES	YES	YES	YES	YES	YES	YES	YES
PFS:WRITE	YES	YES	YES	YES	NO	NO	NO	Only attaches whole files
READIWRITER	NO	NO	YES	NO	NO	NO	NO	NO
SAMNA WORD III	YES	YES	YES	YES	YES	YES	YES	YES
SELECT BILINGUAL	YES	YES	YES	YES	NO	NO	YES	YES
SPELLBINDER	YES	YES	YES	YES	YES	NO	YES	YES
VOLKSWRITER	YES	YES	YES	YES	YES	NO	YES	YES
WORDMARC	YES	YES	YES	YES	YES	YES	YES	NO
WORDPERFECT	YES	YES	YES	YES	YES	YES	YES	YES
WORDSTAR	YES	YES	YES	YES	YES	YES	YES	YES
XYWRITE II-PLUS	YES	YES	YES	YES	YES	YES	YES	YES

Introducing the new Project Scheduler 5000™...

Help! The demands of managing a project have you frantically juggling people and resources. It's getting more complicated and you're about to drop the ball on profits and deadlines.

Successfully managing one project can be difficult. Successfully managing two or three projects can be overwhelming. But now, help is here for you. With Project Scheduler 5000 you can precisely forecast, schedule, control and track large projects easily and quickly. You can replace your frustration with a sense of self-satisfaction from a project well managed.

Main Frame Power — Personal Computer Simplicity

Project Scheduler 5000 brings mainframe capabilities to your personal computer.

This new generation in scheduling software makes possible what was, until now, only a dream: true interactive use and immediate response to changes and additions. You can schedule over 5000 activities spread over 10,000 time periods. What this means is that you can manage the largest projects with ease. While you probably don't need this power on a daily basis, it's nice to know that you have room to grow.

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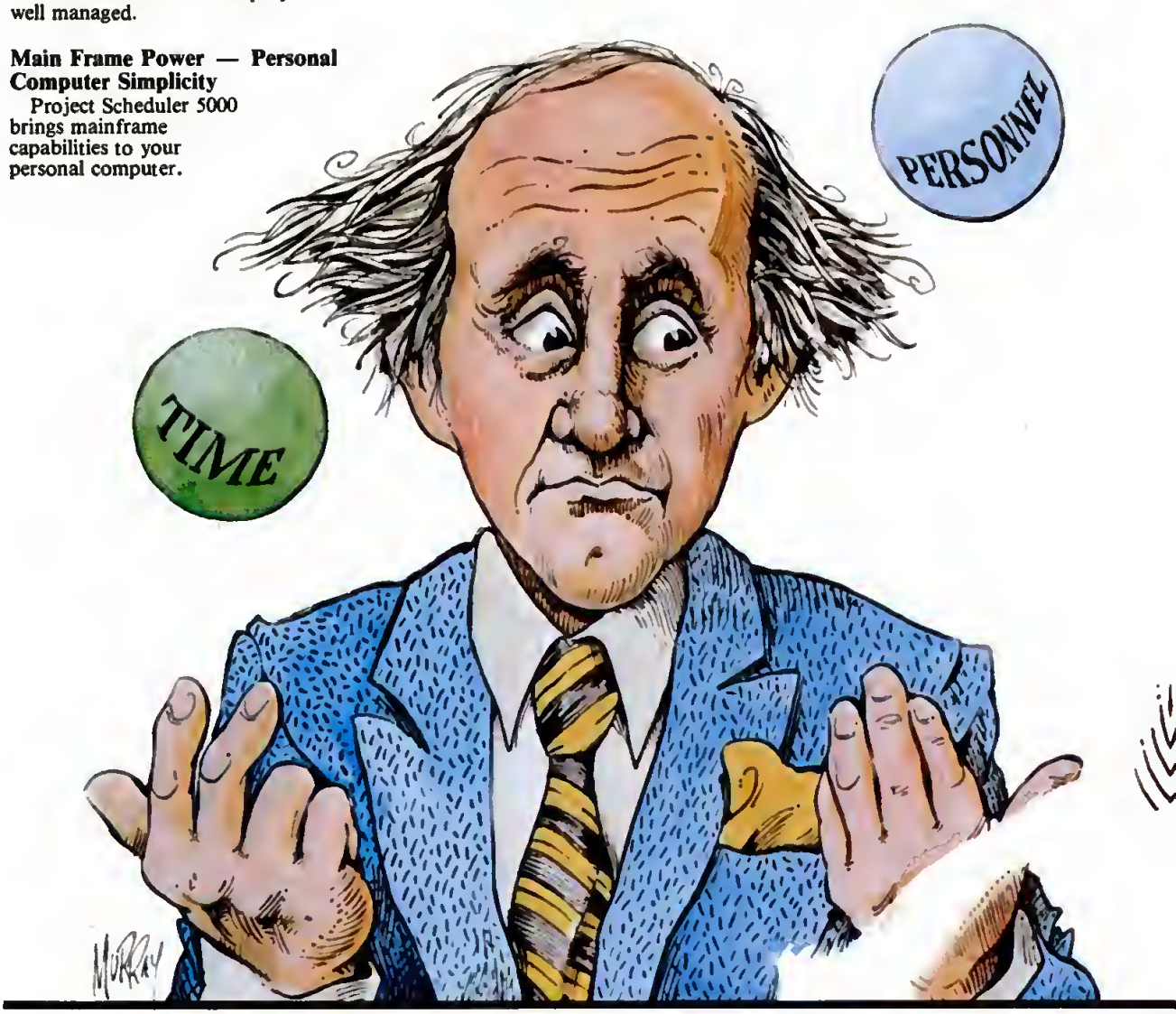
"What if" scenarios are an important source of information that allow you to make the best decision after trying the alternatives. Now you have time for this kind of in-depth planning, because updating and modifying are so simple with Project Scheduler 5000.

A scheduling package should do more than schedule. With Project Scheduler 5000 you never take the risk of making guesses instead of accurate decisions.



... the best solution to effective project management

On Time On Target

Project Scheduler 5000 gives you all the information you need when you need it. Instantly, you know the status of your project.

At a glance, unique plot symbols will let you know whether or not the project is on time and on target and if not, why. Meeting performance goals will become a habit.

Project Scheduler 5000 keeps you constantly informed through its partial complete capabilities. Partial complete status is displayed, reported and used to calculate "value earned".

Accurate Resource Assignment

Extensive resource categories allow you to schedule more efficiently. Using these categories, you can assign to an activity an almost limitless amount of resources. In addition, these resources can be assigned at any point within the activity timeline providing the accuracy you need to build realistic resource profiles by person, labor grade, or other types.

Integration Of Multiple Projects

Keeping track of how a resource is used from project to project can be extremely difficult. Not with Project Scheduler 5000. The program can combine projects to give you a complete overview of where and when resources are used. Graphic presentations can be condensed allowing you to visually compare multiple projects quickly and easily. Think of it! You can simultaneously manage several projects and be on time and meet or beat cost projections on each one.

Get The Picture Any Way You Want It

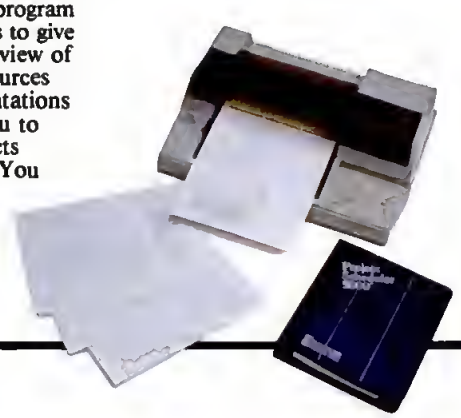
Hours, days, weeks, and months. You can select the resolution you need. In addition, you can break days into as many as 99 units to provide detailed shift or hour resolution. Get the big picture of your schedule on the screen or report by selecting a compressed format which displays up to 60 days, weeks or months of a project.

Fast Comprehensive Reporting

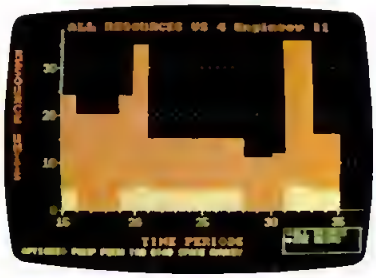
Communicating project information is no longer the time consuming task it used to be. An enhanced report generator synthesizes project information into reports on resource allocation, status, schedule and cost at both the project and the detailed activity level. You can interactively define special reports to give you all the detail you need. Reports and Gantt plots can be printed on hard copy or stored on disk for future use. Presentation quality graphics are available on a color plotter. Additionally, a spreadsheet interface provides labor and cost transfers for further analysis.

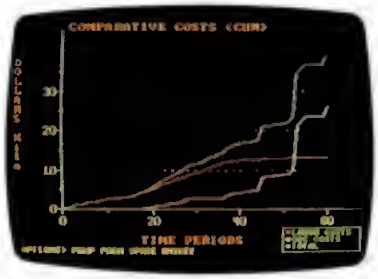
Integrated Graphics Power

Project Scheduler 5000 plus Graphics complements the outstanding scheduling and reporting features provided by Project Scheduler 5000. Using presentation quality financial line graphs, resource histograms, resource bar graphs and other high impact displays, Project Scheduler 5000 plus Graphics provides additional insight as you study in depth the effects of resource allocation, labor usage distribution and cost spreads.



With this control tool you can also track your original cost estimates against updated forecasts and expenditures. Project Scheduler 5000 plus Graphics will help eliminate the possibility that you'll overlook critical costs and deadlines.





Available for PC or MS DOS:
- IBM PC or XT
- TI Professional
- Wang PC*
- Grid Compass*
- DEC Rainbow*

*Project Scheduler 5000 plus Graphics available 4th quarter 1984.

SCITOR

SCITOR CORPORATION
256 Gibraltar Drive
Sunnyvale, CA 94089
(408) 730-0400

Format the three paragraphs of the Gettysburg Address using full left justification and ragged right edge, a left margin of 20, a right margin of 60, and a first line indentation of 26. Then reformat the paragraphs so that they are flush right and left.

☐ Bank Street Writer

In Edit mode, press Tab until FORMAT is highlighted, and then press Return. In FORMAT, choose the feature you want to change. Copy does not realign after formatting, so you have to help it along by using the Del key to eliminate extra spaces.

☐ EasyWriter II

EasyWriter II allows up to eight rulers per document, each controlling left and right margins, right-margin justification, tab stops and decimal tabs, character spacing, and lines per inch. Rulers can be named and called from other documents. Shift-F1 calls the ruler menu. A ruler remains in effect until another ruler is encountered. An *R* at the right margin indicates where rulers change. Once a ruler is set, paragraphs are reformed by pressing F8 (Adjust) or through the main menu's Pagination option, which affects the whole document at once. Other page formatting options, including lines per page, page offset, and the hot zone/balance point option, are stored in the System Parameters menu. Unfortunately, after the Adjust key is pressed, the cursor stays in place instead of moving to the next paragraph. Also, paragraph indents are wiped out during Adjust or Pagination unless the space is held by tildes inserted as "nontrivial blank characters." The tildes won't print from *EasyWriter II*, but they will be passed along if the file is exported in ASCII form.

☐ FinalWord

You cannot set a left margin in *FinalWord*. All text always begins in the first column. The normal left margin for printing is set as a default printing parameter and can be overridden at print time to make a different left margin. To change the right margin (actually, line length), hit Esc while still in the file. The program will prompt you for a numeric argument. Enter the numerals 40 and hit Shift-F10. That will change the line length to 40 characters. In order to set the tab spacing to six characters, hit Esc again, the number 6, and Alt-F10. There is no command in *FinalWord* to reformat an entire document, so you have to go through and reformat each paragraph. This is done by hitting Ctl-PgDn and F9 for each paragraph. The first command moves the cursor to the end of the next paragraph and F9 reformats the paragraph according to the new margins. This takes about 7 seconds. You have to move each line flush right individually, by putting the cursor on a character in the line and hitting Ctrl-R. It takes about 1½ seconds per line.

☐ Leading Edge

To set the margins, hit F3, place the cursor at desired left and right margins, and press L and R. To produce a flush-right edge, hit F3, move the cursor to the right margin, and hit J and the plus sign (+).

☐ Microsoft Word

To format text, select the FORMAT DIVISION command and answer the prompts to create left and right margins and to turn right justification on and off.

☐ MultiMate

You use F9 for formatting. The cursor jumps to the ruler at the top of the screen. You change tabs by using the space bar to erase, and by pressing the Tab key to put one in. As the cursor moves to the right, there is a handy column count.

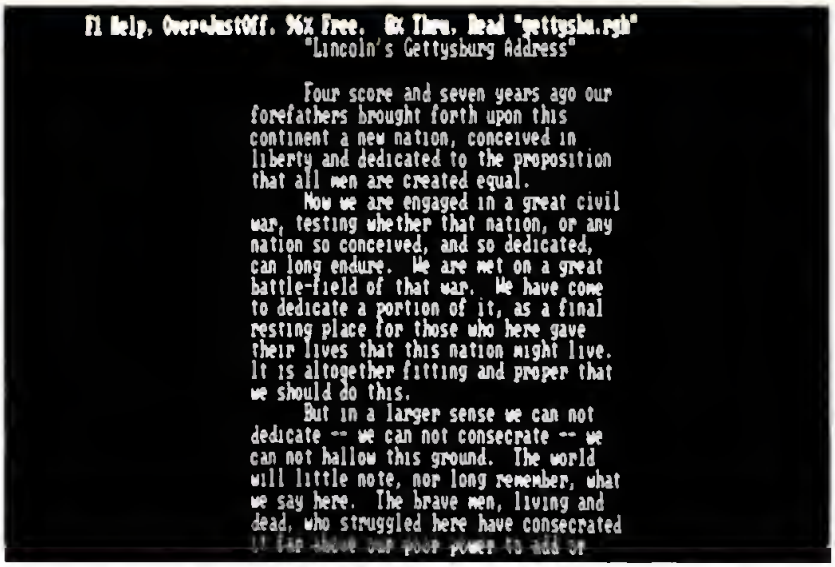
You choose the right margin by reading the column count. When you reach 60, you press Return and then F9 again, and the formatting is done. There is continuous realignment of copy. You can't produce a flush-right edge on-screen—you have to do it just before you print.

☐ Palantir

To set margins, press F1 (Set), F7 (Format), and L for left or R for right. Then move the cursor to where you want that margin to be, and press Enter. To indent the first line, press F1 (Set) and Tab when you're entering it. Paragraphs are formatted on entry. To reformat them, move the cursor to the first line and press F7 (Format). To indicate that paragraph formatting should be flush right, press F1 (Set), F7 (Format), FJ, and then Enter.

(continues on page 136)

PC-WRITE



The editing screen for *PC-Write*. The Overwrite function on the command line can be toggled into Insert with the Scroll/Lock/Break key.

Program	Formatting (onscreen or format codes)	Reformats automatically?	Produces ragged right edge?	Produces flush right edge?	Can justify individual lines?	Hyphenates?	Indents?
BANK STREET WRITER	On-screen	Partially	YES	NO	NO	NO	YES
EASYWRITER II	On-screen	NO	YES	YES	NO	NO	NO
FINALWORD	On-screen	NO	YES	Yes, but line-by-line	YES	NO	YES
LEADING EDGE	On-screen	YES	YES	YES	NO	NO	YES
MICROSOFT WORD	On-screen	YES	YES	YES	YES	YES	YES
MULTIMATE	On-screen	YES	YES	Only at Print	NO	YES	YES
PALANTIR	On-screen	NO	YES	YES	Right justification only	YES	YES
PC-WRITE	On-screen	NO	YES	YES	YES	YES	YES
PERFECT WRITER	On-screen or Format Code	NO	YES	YES	YES	NO	YES
PFS:WRITE	On-screen	YES	YES	NO	YES	NO	YES
READIWRITER	Format Code	NO	YES	YES	YES	YES	YES
SAMNA WORD III	On-screen	YES	YES	NO	NO	YES	YES
SELECT BILINGUAL	Format Code	NO	YES	YES	NO	NO	YES
SPELLBINDER	Format Code	NO	YES	YES	YES	YES	YES
VOLKSWRITER	On-screen	NO	YES	YES	NO	NO	YES
WORDMARC	On-screen	YES	YES	Only at Print	NO	YES	YES
WORDPERFECT	On-screen	YES	YES	YES	YES	YES	YES
WORDSTAR	On-screen	NO	YES	YES	NO	YES	YES
XYWRITE II-PLUS	On-screen	YES	YES	YES	YES	NO	YES

Save the text in a diskette file called GETTYSBU.RG9 without quitting the file or exiting the program. If you can't use that name, create one that is acceptable.

☐ Bank Street Writer

Choose Save from the function menu. The Save programs asks, "Do you want to save all of your text (y/n)?", "Do you want 'Gettysbu' as file name (y/n)?" and whether you want this file to replace the old one. Press Return and the file is saved. Pressing Esc will take you back into the file.

☐ EasyWriter II

Saving the document is done automatically whenever you cross a page boundary or return to the main menu. A backup file can be made by selecting the main menu's Pagination option and specifying that it be written as a separate document. The saved file is in a special *EasyWriter II* format; it can also be exported as a DOS-compatible file.

☐ FinalWord

To save the text, hit Ctrl-F6, type the filename, in this case GETTYSBU.RG9, and Enter.

☐ Leading Edge

The program saves automatically as you go along.

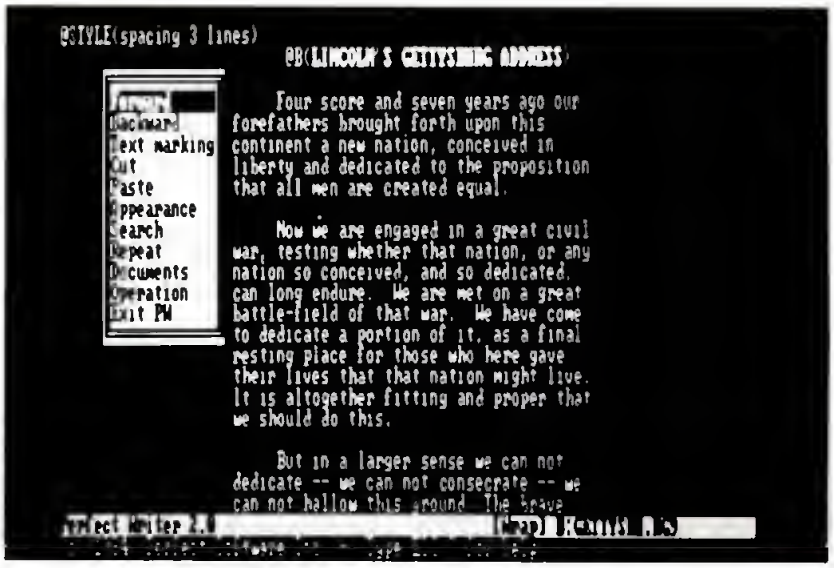
☐ Microsoft Word

To save without exiting, Select the commands TRANSFER, FILE, and SAVE. The system prompts you with a recommended filename; press Return to accept. The system returns to the Edit mode with the document in place.

☐ MultiMate

There are several ways to save a file. The program automatically saves as you work. For example, moving to a new page will automatically save; so will moving with Alt-3 to another editing function. Short of a power failure, it's hard to lose text. The program has a binary file that saves information in 512-byte sections.

PERFECT WRITER



The editing screen for *Perfect Writer*. At left is the main menu, which can be toggled on and off by hitting the Esc key.

☐ Palantir

To save a file, press Esc to get back to the main menu, and then type S to invoke the Save function. You then will be prompted for the name under which to file the data. Saving the file removes it from memory.

☐ PC-Write

About the only way you can lose text is to have a power failure. You cannot exit the program or return to DOS without saving. When you exit you are asked if you want to create a backup. The prompts here are explicit, and the program is well safeguarded.

☐ Perfect Writer

To save a file while editing, either use the Save option from the Documents submenu or strike Shift-F9. *PW* prompts for a filename; hitting the Enter key will then save the file under its new name, which will become the active file. Hitting Enter alone stores the file under its original name.

Warnings to save files appear at critical points, and you are asked to reconfirm major decisions such as editing the program. DOS errors produce standard DOS messages and cause an automatic exit of the program.

☐ PFS:WRITE

To save a file, return to the main menu, choose the Get/Save/Remove option, enter a filename, and press F10. You're warned if you're overwriting an existing file, which is generally the case, since no automatic backup files are kept (you have to do this manually, through DOS). The files is saved in a special PFS format; however, it can be printed to disk as an ASCII file for use by other programs.

☐ ReadiWriter

Simply use the SAVE command to save a file. Then, go on editing the file or issue a QUIT command. The FILE command performs the same task as SAVE followed immediately by QUIT. You can't, however, change the name of the file you're saving. You can use the DOS COPY command before using ReadiEdit (*ReadiWriter*'s text-editing program) and get the same result.

☐ Samna Word III

Samna is constantly saving your work to disk so a save procedure is not necessary. The file is saved in a special *Samna* format. It cannot be examined by using the DOS TYPE command.

Program	Can save without exiting file?	Characteristics as saved	Can automatically save?	Maintains automatic backups?
BANK STREET WRITER	NO	Na special characteristics	NO	NO
EASYWRITER II	YES	Praprietary IUS file	YES	NO
FINALWORD	YES	ASCII file	YES	NO
LEADING EDGE	NO	Praprietary file	YES	YES
MICROSOFT WORD	YES	Na CR/LF till end af paragraph	NO	YES
MULTIMATE	YES	Saves info in 512 byte sections	NO	NO
PALANTIR	YES	128 byte header, special codes, and special line formats	NO	YES
PC-WRITE	YES	Na special characteristics	NO	NO
PERFECT WRITER	YES	Na special characteristics	NO	NO
PFS:WRITE	YES	Special write file	NO	NO
READIWRITER	YES	ASCII file	NO	NO
SAMNA WORD III	YES	Special Samna farmat	YES	YES
SELECT BILINGUAL	NO	Adds X and O ta end af file	NO	YES
SPELLBINDER	NO	ASCII file	NO	YES
VOLKSWRITER	NO	ASCII file	NO	YES
WORDMARC	YES	Various codes, but no CR/LF till end of paragraph	YES	YES
WORDPERFECT	YES	Saves in four different formats	NO	NO
WORDSTAR	YES	Stores information in 8th bit	NO	YES
XYWRITE II-PLUS	YES	No CR/LF till end of paragraph ASCII file	NO	YES

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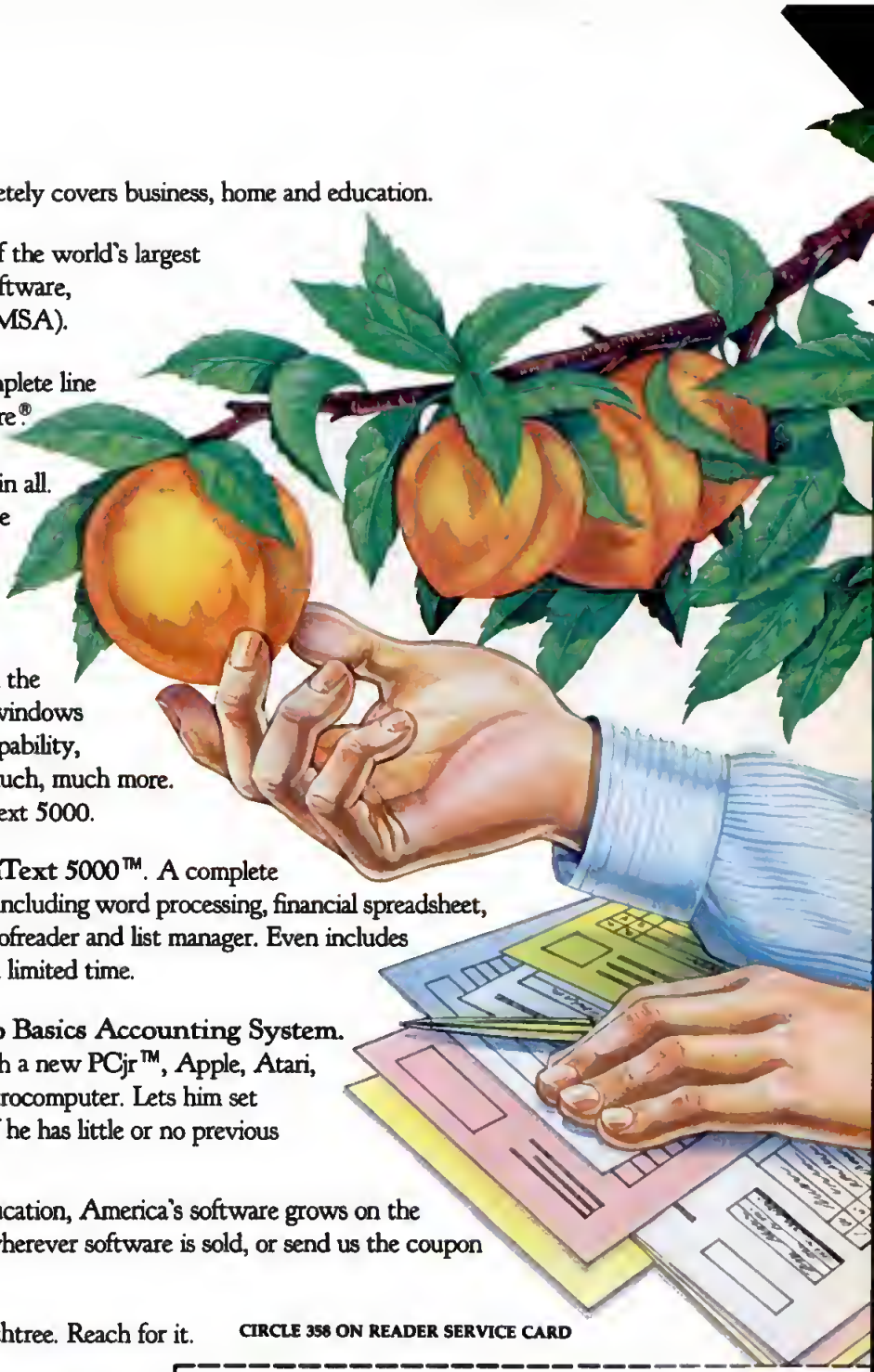

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PRINTING THE FILE

Print the file, triple-spaced, with the word *Page* and the current page number in the upper right-hand corner of each page but the first.

☐ Bank Street Writer

Choose Print from the Function menu, press Return, and follow the series of prompts.

☐ EasyWriter II

EasyWriter II's options include print queuing, multiple copies, printing specified page ranges, simultaneous printing and editing, quick memos typed and dumped to the printer without opening a file folder, printing only the current page without exiting to the main menu, and printing draft copies with lines numbered and ruler locations marked. Headers and footers can be on multiple lines and can be changed throughout the document. There's an optional *EasyMailer II* program for merge-printing.

☐ FinalWord

At the very beginning of the text, you insert

```
@STYLE (spacing 3 lines)
```

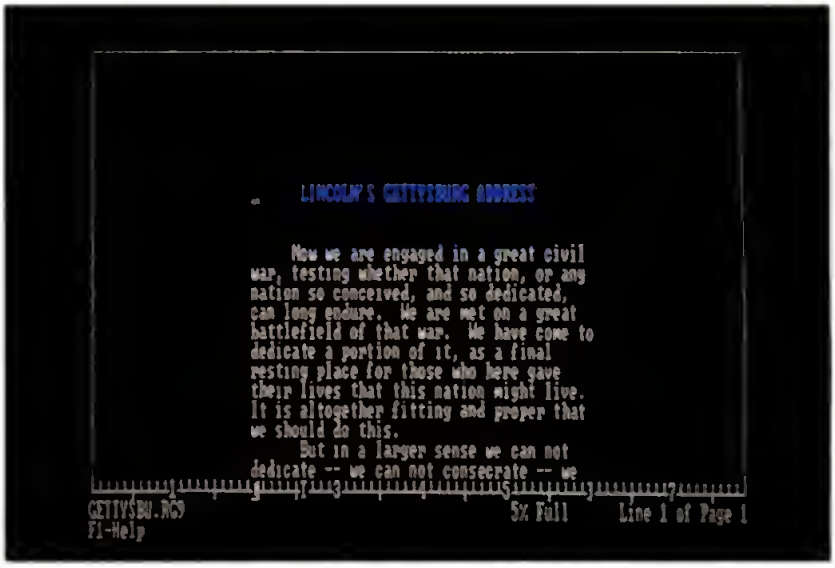
to make the document appear in triple space. The default pagination procedure for *FinalWord*'s advanced formatting is to put the number at the center of the bottom of the page. In order to suppress this, you would embed the code @PAGEFOOTING( ) after the style command. In order to get the literal and the page number in the upper right-hand corner, you would have to specify a header, which would take the form

```
[@PAGEHEADING(right
"PAGE@VALUE(page)")]
```

This code should be embedded in the text somewhere after the first few lines of text so that the first page would not have a header.

After you have made these changes in the text, you hit Ctrl-A (for advanced print). The program will then prompt you for print options such as the number of copies to print, the device to use, at which page to start printing, and so on. There is no menu for the options, so you must remember them or check the manual. If you are not planning to override any standard printing parameters, just hit Enter. The program will write the buffer to disk and then produce an intermediate file, with the extension .F$$, which contains the printer control codes necessary to produce the document. Once the .F$$ file is produced, the program will pause and ask if you would like to print. Hit Y for yes and the document will print.

PFS:WRITE



The editing screen for *PFS: WRITE*. The paragraph indents are indicated by the letter T on the on-screen ruler below.

☐ Leading Edge

To print, close the file, go back to the main menu, choose Print, and hit the plus sign key. Hitting 5 on the number pad brings up a utility menu that allows adjustment of page headings and footings, including page number.

☐ Microsoft Word

Some formatting commands are done by "division" (page elements chosen by the user) and some by paragraph. In order to suppress the number on the first page, I simply refer the first page to its own division, do not number that one, and start the page count at two on the second division (the next page).

Triple spacing is simply a matter of electing a spacing count in the paragraph-formatting subcommand (formatting is by division, paragraph, or character).

Since the primary commands are always shown on the edit pages, simply choose the PRINT command to print.

☐ MultiMate

To print, go to the Print Document utility in the main menu, which presents you with a large series of options, depending on what you want to do with the file.

☐ Palantir

Pressing F1 (Set) and H (heading) allows you to indicate what should be in the heading. You can indicate that the current page number appear in a heading (or footing) by moving the cursor to where the page number should appear and pressing F1 (set) and #. To request triple spacing, press F1 (set), F7 (format), O (other), S (spacing), 3, and then Enter.

☐ PC-Write

The editing file and printing files are not integrated. To print, you have to return to DOS and call up the Print field and send the document to it to handle the job.

(continues on page 170)

Program	Can edit during printing?	Can edit after printing?	Can format page number?	Can suppress page number?	Can format top and bottom margins?	How many printer support files?	Has device support language?	Claims universal printer support?
BANK STREET WRITER	NO	YES	YES	YES	YES	Nonspecific support file	YES	YES
EASYWRITER II	YES	YES	YES	YES	YES	75	YES	NO
FINALWORD	NO	YES	YES	YES	YES	28	YES	NO
LEADING EDGE	Other files only	YES	YES	YES	YES	8	YES	YES
MICROSOFT WORD	YES	YES	YES	YES	YES	22	YES	YES
MULTIMATE	NO	YES	YES	YES	Yes, when printing	65	YES	YES
PALANTIR	NO	YES	YES	YES	YES	Over 25	NO	NO
PC-WRITE	NO	YES	YES	YES	YES	8	YES	NO
PERFECT WRITER	NO	YES	NO	NO	YES	64	YES	NO
PFS:WRITE	NO	YES	NO	YES	YES	Universal drivers	YES	YES
READIWRITER	NO	YES	YES	YES	YES	31	YES	NO
SAMNA WORD III	NO	YES	YES	YES	YES	21	YES	NO
SELECT BILINGUAL	YES	YES	YES	YES	YES	10	NO	NO
SPELLBINDER	NO	YES	YES	YES	YES	11	YES	YES
VOLKSWRITER	YES	YES	YES	YES	YES	21	YES	YES
WORDMARC	YES	YES	YES	YES	YES	45	NO	YES
WORDPERFECT	YES	YES	YES	YES	YES	29	YES	YES
WORDSTAR	YES	YES	YES	YES	YES	17	YES	YES
XYWRITE II-PLUS	YES	YES	YES	YES	YES	18	YES	YES

Enter an illogical or misspelled subcommand. Open the door of the data disk drive and try to save the file.

☐ Bank Street Writer

Errors are handled well. An illogical subcommand elicits a beep and a very explicit message. An I/O error elicits a beep and the following message: "Disk error, check disk and drive—press Return to continue."

☐ EasyWriter II

Errors are generally trapped without damage to the document, and short messages explain what went wrong. Running out of disk space means you'll lose your last changes, but never more than one page. And since *EasyWriter II* lists remaining disk space on-screen during editing, you're forewarned. Swapping *EasyWriter II* system and housekeeping disks is OK, but it's possible in some instances to do serious damage to a file folder by swapping data disks. My experimentation with disk swapping to see what could go wrong rendered an entire file folder unusable. Using *EasyWriter II*'s check-for-errors utility then hung up the system.

☐ FinalWord

If you try to save a buffer to disk with the drive door open, you will get the standard DOS error message: "Not ready. Error reading drive B: Abort, Retry, Ignore?" Close the drive door and hit R. The buffer will write out to disk. However, the DOS error message remains on the screen until you hit the Ctrl-D key combination (display refresh), which restores the original text screen.

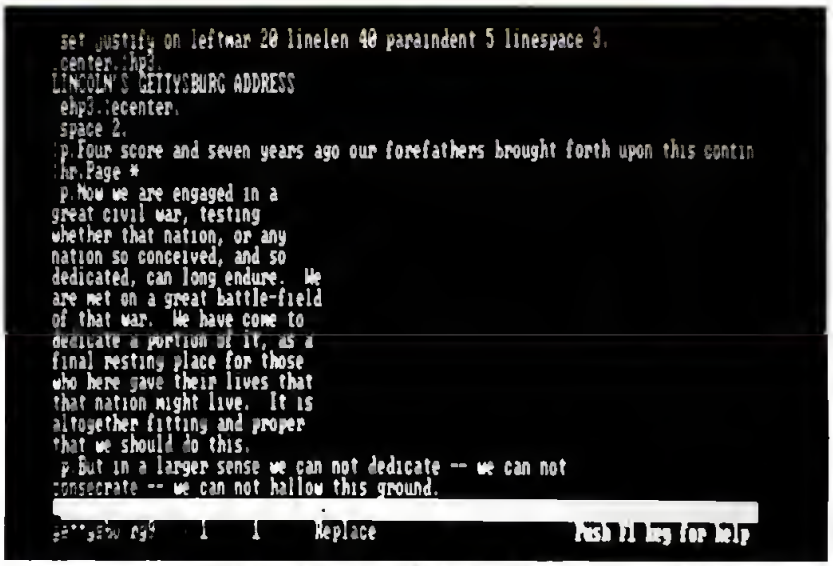
☐ Leading Edge

An illogical command will elicit a short error message. An I/O error elicits a message saying that there is a problem and asking you to fix it or try again.

☐ Microsoft Word

The program tries to recover from I/O errors for 30 seconds, then beeps and asks you if it should try to save out to NEWFILE.TMP.

READIWRITER



The editing screen for *ReadiWriter*. All of the formatting commands are indicated by the codes to the left of the main text.

☐ MultiMate

Error messages in response to illogical commands are simple and self-explanatory. In response to I/O errors, *MultiMate* generates a beep and issues the following error message: "Drive B: is not ready. Close drive door. Press A to abort; I to continue; R to retry."

☐ Palantir

If you make an invalid menu selection, *Palantir* will beep you. In more complicated contexts, it will produce more helpful error messages. *Palantir* will not, however, recover from I/O errors of the sort that cause DOS to prompt "Abort, Retry, Ignore?" If you press A in response to one of these messages, you go back to DOS immediately and whatever you were working on is lost. It can be dangerous to swap disks while editing, because *Palantir* uses spill files when in the middle of block operations.

☐ PC-Write

Errors are not signaled by a beep. I typed in a wrong subcommand: an erroneous name for a file. The *PC-Write* error message was clear: "Wrong name for the file?" *PC-Write* error messages are usually self-explanatory. The manual includes a glossary of them in Appendix C. Many are familiar DOS messages, and explanations are good.

PC-Write handles I/O errors the same way as DOS—Abort, Retry, Ignore? The program warns you if you are about to run out of disk space.

☐ Perfect Writer

Because of its menu-driven structure, which will not accept an illegal entry, *Perfect Writer* permits fewer opportunities for common user errors than many similar programs. Program error messages are generally in plain English and appear as highlighted windows.

☐ PFS:WRITE

PFS:WRITE is pretty much bulletproof: errors don't do any damage to the program. The on-screen error messages are self-explanatory; they tell you, for example, that you tried to retrieve a nonexistent file, or that you set a margin bigger or smaller than allowed. Since your document is in RAM, trying to write a finished document to a full disk is no problem: simply stick in another disk and try again. An I/O error just returns you to the main menu.

(continues on page 173)

Program	Error beep?	Error message?	Error message self-explanatory	Erroneous subcommands left onscreen?	Recovers from I/O errors?	Can swap disks during edit?	Running out of disk space or loses file?
BANK STREET WRITER	YES	YES	YES	YES	YES	YES	NO
EASYWRITER II	NO	YES	YES	YES	YES	NO	YES
FINALWORD	NO	YES	YES	YES	YES	YES	NO
LEADING EDGE	NO	YES	YES	NO	YES	YES	NO
MICROSOFT WORD	YES	YES	YES	NO	YES	YES	NO
MULTIMATE	YES	YES	YES	YES	YES	YES	NO
PALANTIR	YES	NO	Manual is helpful adjunct	NO	NO	YES	NO
PC-WRITE	NO	YES	YES	YES	YES	YES	NO
PERFECT WRITER	NO	YES	YES	NO	NO	YES	YES
PFS:WRITE	NO	YES	YES	YES	Returns to main menu	NO	NO
READIWRITER	YES	YES	YES	YES	YES	NO	NO
SAMNA WORD III	NO	YES	YES	YES	YES	NO	NO
SELECT BILINGUAL	YES	NO	Not always	NO	NO	NO	NO
SPELLBINDER	YES	YES	Often cryptic	Usually not	YES	NO	Slight damage possible
VOLKSWRITER	YES	YES	YES	NO	YES	Yes, except for spill file	NO
WORDMARC	YES	YES	YES	YES	YES	YES	NO
WORDPERFECT	Sometimes	YES	YES	Sometimes	Sometimes	NO	NO
WORDSTAR	NO	Only if real command used incorrectly	YES	NO	YES	NO	NO
XYWRITE II-PLUS	YES	YES	YES	YES	YES	YES	NO

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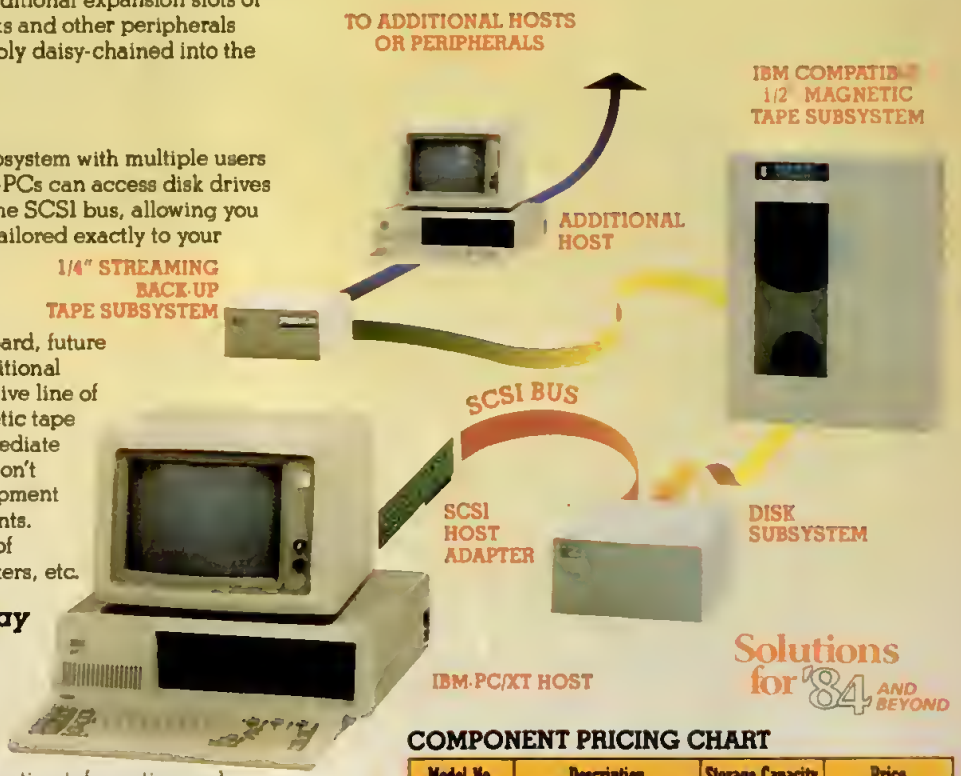
If not satisfied, the subsystems may be returned on approval from IDT within a 10-day period. All subsystems and components carry a six-month return-to-factory warranty on parts and labor.



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RD 2023S	Slave Disk Drive	23MB	2130.00
RD 2035S	Slave Disk Drive	35MB	2530.00
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EXITING THE PROGRAM

Quit the file, exit the program, and return to DOS.

☐ Bank Street Writer

To exit the program, you can choose the Quit to PC-DOS option from the main editing menu. There is also a utility menu that will perform several functions, such as Quit to Format Disk. It is very difficult to exit *Bank Street Writer* without being stopped and reminded to save the file you've been working on.

☐ EasyWriter II

Quitting *EasyWriter II* and returning to DOS is quick, and there's almost no chance of losing text, since the Esc key that returns control to the main menu automatically writes changes from RAM to disk.

☐ FinalWord

To exit back to DOS, hit Ctrl-E (for Exit). If the buffer has been written out to disk, you will go directly back to DOS. If the buffer has been edited since it was read in from disk or was created in *FinalWord* and never written to disk, the program will ask for confirmation that you wish to leave the program. Hit Y for yes. This confirmation is not really necessary because any buffer you have created or edited is still part of the SWAP file that resides on the program disk. The confirmation simply checks to see whether you have written that buffer out to a separate file on disk.

☐ Leading Edge

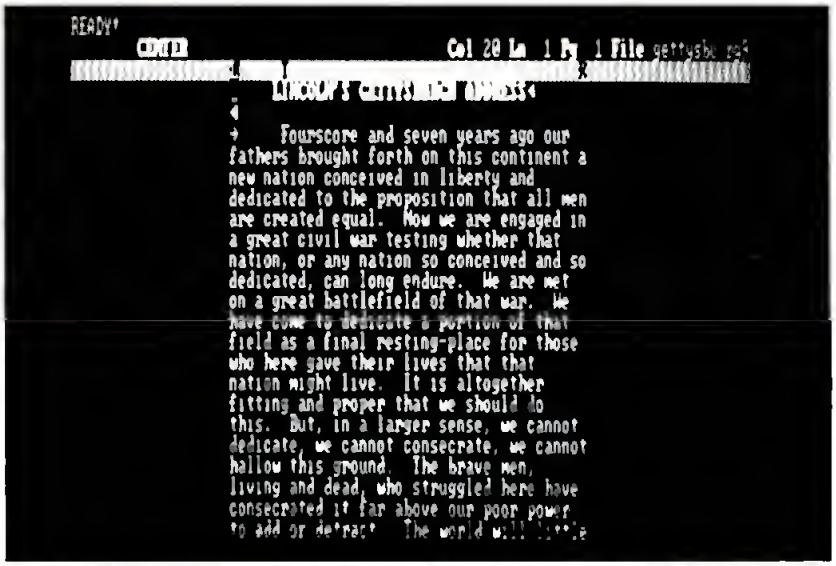
To exit the file, you simply hit the Esc key twice.

☐ Microsoft Word

Hit TRANSFER from the Edit screen command line. You are given a collection of things to do: one is to save. If you save, you are asked for a filename or to verify a filename. You're also asked if the file should be saved in a formatted configuration.

To get into DOS, hit QUIT from the Edit screen. If you quit without saving the file, the program will prompt you either to save the file, abandon it, or cancel the command.

SAMNA WORD III



The editing screen for *Samna Word III*. The columns of reverse video, which indicate the margins, can be turned off if desired.

☐ MultiMate

To exit the file, press Alt-9. The working file is automatically saved, and DOS comes up.

☐ Palantir

After saving the file, you go back to the main menu. At that point, pressing the Esc key will return you to DOS.

☐ PC-Write

Exiting the program is simple. You simply press F1, and the status line at the top tells you that your file is being written to disk. Press F2 and you are back at the DOS prompt.

☐ Perfect Writer

To exit the program at any point, simply strike the Esc key to get back to the main menu and then E for Exit. The program's initial boot-up screen appears with a number of program options. The user chooses R for Return to DOS and is prompted to reconfirm the exit.

☐ PFS: WRITE

To exit to DOS, return to the main menu and choose the Exit option. If you have a document stored in RAM, you're reminded to save it first.

☐ ReadiWriter

Exiting ReadiEdit is a simple matter of issuing a QUIT command before editing a file or after quitting a file. *ReadiWriter* is more like a compiler than an interactive program. When it gets to the end of the file you've asked it to format, it cleans up and stops.

☐ Samna Word III

You save the file by hitting the F1 function key and then the Enter key. You exit to DOS by hitting F9, X (for Exit), and the Enter key.

☐ SELECT Bilingual

Exiting the program is accomplished by quitting the file you were working on (which brings you back to the main menu) and typing Q (for Quit), and then S (for System).

☐ Spellbinder

Spellbinder does warn you if you try to exit before files are saved. In fact, it won't allow you to exit to DOS without a controlled withdrawal from the program. However, shutting off the power without closing the files may damage the active file.

(continues on page 174)

Program	Warns of unsaved file?	Must run another program to translate to printer control characters?	Time to process file
BANK STREET WRITER	YES	NO	15 secands
EASYWRITER II	File autamatically saved	NO	10 secands
FINALWORD	YES	Yes, if using advanced formatting	24 secands
LEADING EDGE	Can't exit withaut saving	NO	Immediate
MICROSOFT WORD	YES	NO	Under 4 secands
MULTIMATE	File autamatically saved	NO	7.6 secands
PALANTIR	YES	NO	22 secands
PC-WRITE	YES	YES	20 secands
PERFECT WRITER	YES	NO	2 secands
PFS:WRITE	YES	NO	Under 5 secands
READIWRITER	YES	Yes, an RW pragram	50 secands
SAMNA WORD III	Always saving to disk	NO	Immediate
SELECT BILINGUAL	YES	NO	10 secands
SPELLBINDER	YES	NO	10 secands
VOLKSWRITER	YES	NO	7 secands with .BAK 4 seconds w/a .BAK
WORDMARC	Menu structure farces save	NO	2 secands
WORDPERFECT	YES	NO	Under 4 secands
WORDSTAR	YES	NO	Varies
XYWRITE II-PLUS	YES	NO	Immediate

What was your overall impression of the word processor you reviewed?

☐ Bank Street Writer

Bank Street Writer's greatest virtue is its simplicity. But is *Bank Street* too simple? Can a program that can be easily learned by 8-year-old children be a serious choice when compared with 192K word processing programs?

The answer is yes. You can take the *Bank Street Writer* seriously, folks. It is a wise choice as *the* family word processing program. And while some members of the family may want to move on to another word processing program with more versatility and features, *Bank Street* can serve just about any word processing need a family has.

It does have some drawbacks. I am an experienced writer who does not like limits on the amount of work I can handle. *Bank Street* treats me a little like a child, assuming that I can make small changes quickly (in the Writing mode) but that I should be slowed down when I mess with whole sentences or even whole paragraphs. There is something patronizing about this arrangement that irritates me.

In the same vein, sometimes *Bank Street* puts me through too many steps to remove text. Usually, when I am ready to delete text, I have a roaring need to get it out of the way. But it takes eight keystrokes in the *Bank Street* Erase function to eliminate what I am pretty certain I no longer want. Thus, to experienced word processors, *Bank Street* can seem a bit too cautious.

You will have to decide for yourself. But be assured that this little gem is a very professional and surprisingly versatile word processing program.

☐ EasyWriter II

EasyWriter II falls in the great middle between super-easy-to-learn, limited-function word processing programs and powerful, painful-to-learn programs. If you can adapt to two or three of its major quirks—orientation by pages instead of complete documents, no automatic hyphenation, and many documents stored together in a single file folder—you'll probably be very happy with *EasyWriter II*. It loads automatically, text is saved automatically, no more than a single page is ever at risk in the event of a power failure, what you see on-screen is just about exactly what you get on the printed page, the search/replace and printing facilities are excellent, and the program is fairly easy to learn.

The page orientation takes some getting used to, and the mode method of editing will slow down a quick typist who makes more than a few errors. But overall, its pluses seem to outweigh its minuses.

☐ FinalWord

FinalWord is not easy to learn, but you will find it very rewarding in the long run. I think its greatest strength is its many different commands and the option it gives you of attaching those commands to the keyboard sequences of your choice. This ability makes *FinalWord* one of the most versatile and powerful programs on the market. Its versatility might be lost in a multi-user environment, where people might disagree on how to customize the program, but for a single user it is a godsend.

FinalWord lacks some of the snazzy features that other word processors offer. It does not come with a spelling checker (though the pure ASCII files it generates are easy to proof with commercial checkers). It is no good at hyphenation, has a poor indexing feature, and has no mail merge feature. Although a great deal can be done in its simple print mode, advanced formatting and printing—for those who must have footnotes, tables of contents, and so on—is a little tricky to learn. Nevertheless, in the basic business of creating and editing text, *Final Word* is truly a joy to use.

☐ Leading Edge

I tend to react negatively to hype, so the three-page *Leading Edge* ads that start with the statement, "It can change the way you work, the way you think, the way you live," ensured that I approached the program with a great deal of skepticism. I came away ready to give *Leading Edge* a qualified recommendation, which means that the program is doing something right. This is not to say that *Leading Edge* lives up to its ad; few things short of religious conversion could. Still, it does have many attractive features such as its ability to edit two files at once, its sophisticated Search

(continues on page 177)

SELECT Bilingual

The editing screen for *SELECT Bilingual*. There is no on-screen formatting; the user must insert the appropriate formatting codes.

Program	Can personalize file?	Can "print to disk"?	Can generate table of contents?	Can generate an index?	Can generate footnotes?	Built-in spelling dictionary?	Other notable features
BANK STREET WRITER	YES	YES	NO	NO	NO	NO	Simplicity
EASYWRITER II	YES	Text only	NO	YES	Semi-automatic	Only in "system" package	Extensive documentation of file status
FINALWORD	Can customize keyboard	YES	YES	YES	YES	NO	Can adjust windows, can determine type faces
LEADING EDGE	YES	YES	NO	NO	NO	NO	Auto-saves to disk, Disk-Full Warning
MICROSOFT WORD	YES	YES	NO	NO	YES	NO	Merge function, WordStar conversion utility
MULTIMATE	YES	YES	NO	NO	NO	On separate disk	"Boiler plate insertion," Merge, Print spooling
PALANTIR	YES	NO	NO	NO	NO	NO	Disk management subcommands, executes COM and EXE files while in edit
PC-WRITE	YES	YES	NO	NO	NO	NO	Program uses buffer to hold most of file
PERFECT WRITER	YES	YES	YES	YES	YES	YES	Creates form letters, automatic in-text referencing
PFS:WRITE	NO	Only ASCII text	NO	NO	NO	NO	All editing via function keys and cursor pad
READIWRITER	YES	YES	YES	YES	YES	NO	Includes powerful text formatter
SAMNA WORD III	YES	NO	YES	YES	YES	YES	Mailmerge, draws boxes for charts, prints in columns
SELECT BILINGUAL	NO	Yes, but can't be read by other program	NO	NO	NO	YES	Bilingual: Spanish or English commands
SPELLBINDER	YES	YES	NO	NO	YES	YES	Built-in math functions, sort/alphabetized macros
VOLKSWRITER	YES	YES	NO	NO	NO	NO	Merge/print facility, WordStar translator, programmable "special effects" keys
WORDMARC	Yes, for computer and printer type	YES	NO	NO	NO	YES	Encryption, multi-language prompts and keyboards, partial power outage protection
WORDPERFECT	NO	YES	NO	NO	YES	YES	Mailmerge, widow-orphan protection, math calculations, across and down columns
WORDSTAR	YES	YES	NO	NO	NO	NO	Extensive flexibility
XYWRITE II-PLUS	YES	YES	YES	YES	YES	NO	Creates macros, mailmerge, creates forms, widow & orphan control

LOADING THE FILE

(continued from page 114)

☐ **PC-Write**

Any working or data diskette you use has to be copied with *PC-Write*'s editing file and printing file. You then load up the RAM with DOS and, at the A> prompt, do one of three things: you can type DOS DIR to see a directory of files and make your choice of which file you want to edit; type ED <filename> if you are creating a new file; or simply type ED if you want to create a new file that you have not yet named.

It is noteworthy that this program uses only one disk drive, which contains the program and the data you are creating. One way of looking at this is that each disk is self-contained, but another way is that it is a pain to have to copy the *PC-Write* files to each and every disk you plan to use.

☐ **Perfect Writer**

The first screen that appears has a nine-part menu with choices for word processing functions, exit to DOS, file utilities, and access to *Perfect Calc*, *Perfect Graph*, *Perfect Link*, and *Perfect Filer*.

To load a file, choose the Write/Edit option from the main menu. The program prompts you for the filename, and pressing the Enter key calls up the document. If you're unsure of the name, choose the Documents option and the Directory function from the Documents submenu. *Perfect Writer* prompts for the drive and produces a directory in a highlighted mini-window. Put the cursor at the desired filename and strike Enter to load the file.

☐ **PFS:WRITE**

PFS:WRITE is almost completely menu-driven. To fire up the program, pop the copy-protected diskette in drive A: and type WRITE. The main menu offers six options that allow you to type/edit, define page, print, get/save/remove, clear, and exit. To begin writing a new document, select the Type/Edit option and then press F10 (the Continue key). All PFS programs use F10 instead of the Enter key to mean "continue."

PFS:WRITE accepts ASCII files when you type F9 (the Append key), give the filename, and press F10. There are no restrictions on filenames, such as .BAK, .EXE, .COM, or .$$$ extensions. The name can be preceded by a drive name, but *PFS:WRITE* won't work through DOS 2.0/2.1 subdirectories. If the file being imported has blank spaces to the left of the text, as did *PC*'s test file where text was aligned at the right margin, *PFS:WRITE* will format the text oddly, and the effort to edit out the blanks may be more trouble than it's worth. It's also possible to insert a file at print time by typing JOIN <filename> at the appropriate place. Graphs from the *PFS:GRAPHS* program can also be inserted by this method.

☐ **ReadiWriter**

First, load the ReadiEdit program, which contains the text editor for the *ReadiWriter* package. This puts you into a blank screen with the command line at the bottom. Use the EDIT subcommand to load the file. There are no restrictions on the filenames or name extensions.

☐ **Samna Word III**

This program must be loaded from two disks. The first disk boots for 30 seconds, after which a beep tells you it's time to put in the second disk, which takes another 24 seconds to load. The program will then prompt you for the date and time. It will pick up the system date and time but waits for you to accept them (by hitting Enter) or to change them before it will go on to the opening screen.

Hit F9, T (for Translate), A (for ASCII-to-*Samna*), type GETTYSBU.RG (to indicate the source of the translation file), Y or N (to indicate whether you want *Samna* "new paragraph" marks at the end of each line or at the end of each paragraph), and hit Enter. The entire file will then scroll up the screen as it is translated into *Samna* format.

☐ **SELECT Bilingual**

The initial screen has a menu of subcommands for edit, help, save, print, and other such operations. Loading is a simple matter of using the EDIT subcommand. Since incarnations of your file get saved with various extensions such as .BAK, .SEL, .TTY, and .SPL, you're effectively restricted to identifying your file by filename only.

☐ **Spellbinder**

There is no main menu.

Loading or opening a file can be a multistep process. You need to open a read file (where the document is now) and a write file (where the document is headed). All told, there are 14 separate read and write commands. For short memos, however, it's possible to work in RAM without ever creating a file and then dump the memo to the printer. DOS 2.0/2.1 subdirectories aren't supported. ASCII files can be used once they're stripped of carriage returns and unwanted spaces to the left of the text.

☐ **Volkswriter Deluxe**

To load a file, type R. The program then prompts for a filename. Type the filename and then hit Enter. In the initial start-up screen, the top three lines are a menu of the program's main options to retrieve a file, edit, print, and so on. Also included are file maintenance commands. There is a 17-line blank window that will display a directory when requested. To load a file, type R <filename> at the main menu.

☐ **WordMARC**

WordMARC's initial screen is a menu that offers various edit, file, and print modes. To load GETTYSBU.RG, select the Edit option from the first menu screen and answer the prompt for a filename.

☐ **WordPerfect**

After booting up DOS on the PC, type WP. A preliminary screen indicates that the program is loading, and after about 3 seconds the main *WordPerfect* screen is displayed. There is no main menu; the start-up screen is blank and ready to accept text.

WordPerfect can both import and export ASCII files. Press Alt-F1 to get the Extended Features menu and then choose the second option (Prepare/Protect documents) to call up another menu. Select the

option to retrieve a DOS text file, and you are prompted for the name of the document. Then press Return, and the file will appear on the screen.

☐ **WordStar**

The initial screen is divided into two sections: an opening menu and a directory of the logged disk. The menu is divided into five cleanly labeled sections, including preliminary commands, file commands, system commands, commands to open a file, and options. To open a file, hit D at the main menu, and at the prompt give the name of the desired file.

☐ **XyWrite II-plus**

Loading a file can be accomplished in several ways. The basic commands for text files are CALL or EDIT (which, like the majority of *XyWrite* commands, can be abbreviated to the first two letters) and they are executed from the command line, followed by the name of the file you want. There are no restrictions on filenames that are not found in DOS. If you are not sure of the name, you can call up a directory with the DIR command, type CA or ED on the command line, move the cursor to the file you want, and hit F9. If your file is a *XyWrite* program file or form file, the command is the same, except that you add a P in the case of program files or an F in the case of a form file (in which case you also have to give the name of the file you want to create from the form).

HELP SCREENS

(continued from page 116)

☐ **SamnaWord III**

The Esc key is the Help key. It can be used to bring up a menu of initial help information, or, in combination with specific commands, to bring up help information about those commands.

A directory of the files on the B: drive can be obtained by hitting F1, D (for Directory), and Enter.

☐ **SELECT Bilingual**

You can get help on any topic at any time by typing H and the first letter of the specific subcommand. SELECT Information Systems deserves special credit for offering a bilingual word processor. At any time during its operation, the BILINGUAL command will switch between English and Spanish for you. All prompts, menus, and messages are presented in the language of your choice.

☐ **Spellbinder**

To get on-screen help, hit F1 to switch from Edit to Command mode, then press F2, then choose one of several help file suboptions. Sound awkward? It is. The help messages are contained in a series of text files, so you can tailor or add to them if you need to. There is no keyboard template, although it would be a big help to have one.

☐ **Volkswriter Deluxe**

Included in the start-up screen is a menu of the program's main options: Retrieve a file, Edit, Print, and so on. Also included are file maintenance commands. At the opening menu, type H for an explanation of main options. During editing, F1 will call up a menu of editing commands on the top seven lines of the screen. There is a 17-line blank window that will display a directory when requested.

☐ **WordMARC**

There is no on-line Help facility with information about specific keys or subcommands; however, the prompting is good. Once you are accustomed to the program, you can get rid of all the menus and run the program with commands only.

☐ **WordPerfect**

WordPerfect provides a good help system. By pressing Shift-F3 and then the combination of keys for the command in question, a Help screen appears for the selected command. A keyboard overlay shows just about every command combination, and 10 self-stick key overlays are color-coded to match the keyboard overlay.

☐ **WordStar**

As shipped, menus with general help information are always on-screen. They can be toggled off when they are no longer needed. Ctrl-J takes you to a separate help menu where you can ask for more information about functions. From within a file, Ctrl-JH will let you choose from any of four help levels, or you can reinstall the program so it will boot up in the help level you prefer.

A directory of the logged disk appears on the opening screen and can be toggled on and off.

☐ **XyWrite II-plus**

Four screens of help can be called up by hitting Alt-F9 four successive times. They contain information about the key functions and editing commands for most of the commands you are likely to use for everyday word processing. Since they are ASCII text files, you can edit them or write your own help from scratch. After you have made up help files, you must name them HELP0, HELP1, HELP2, and HELP3 so that the program will recognize them.

ENTERING DATA

(continued from page 118)

☐ **PC-Write**

At the top of the screen, you see a single status line that reads:

```
F1 Help. Over. Just Off.
99% free
99% thru Edit ''Work.doc''
```

Under this line, the cursor sits at top left. You enter text by choosing which mode you want: Insert or Overwrite. You switch into one or the other by toggling the Scroll Lock/Break key.

If you call up a file just to look at it, the status line will say Read instead of Edit. Make a change, however, and you will know instantly that you are in the Edit mode. If you justify the right margin, the status line will tell you that, too. You can also insert a helpful ruler line by simply pressing F2 and letting it stay on the screen. The program supports a full 156 characters a line.

☐ **Perfect Writer**

The Edit screen is blank except for two

lines at the bottom. The first, in inverse video, lists the program name, filename, and three status indicators: wordwrap on or off, text revised but not saved, and delete buffer empty or full. The bottom line carries a copyright notice and informs you that the Esc key brings up the Help menu.

☐ PFS: WRITE

The start-up screen displays a rectangle representing a sheet of paper, with a ruler line at the bottom, margins set at 10 and 70, and a single tab stop at 15. Start typing and the first bit of text appears ten spaces over and six lines down, just like on a sheet of paper. As you type, a second cursor marks your position on the ruler line. Long words automatically wrap to the next line. After you have typed 54 lines, a second electronic page scrolls into place just below the first. If you previously ordered up a page number or a footer (through the Define Page option at the main menu), that appears here, too, centered at the bottom of the first page.

☐ ReadiWriter

The screen has a reverse-video command line on line 24. Line 25 is a status line that contains the cursor row and column number, insert/replace toggle, the message "Push F1 key for help," and the current file specification.

☐ Samna Word III

The initial Edit screen has columns of reverse video down the sides, which indicate where the margins are set. (This light show can be turned off if you don't like it.) The top line is reserved for commands and always displays the message "READY!" when the program is prepared to accept commands. The second line indicates the page, column, and line number of the cursor's current location and gives the name of the file being edited. The third line of the screen is a ruler that indicates right and left margins and tab stops.

☐ SELECT Bilingual

The editing screen is blank except for a menu line, a status line, and a ruler line. The menu line offers functions such as Insert, Locate, and Replace. The status line indicates the name of the open file and the current character, line, and page numbers.

☐ Spellbinder

During text entry, the top of the screen indicates whether *Spellbinder* is in the Edit or Command mode, whether insert is on or off, the cursor position, and the current text mode: character, word, sentence, paragraph, or mark (a block stretching down to a caret [^] mark). Text can be deleted, moved, copied, or enhanced (underlined, boldfaced) in any text mode. Function keys convey most of the edit commands. The screen holds 80 characters across, and long lines automatically wrap down. File size is limited only by RAM capacity and longer documents can be held partly in RAM and partly on disk.

☐ Volkswriter Deluxe

In the editing mode, the bottom line is in reverse video. It gives information about the default drive, the filename, line, column, and page number. To convey editing commands, you use the function keys—alone or in conjunction with the Alt, Ctrl, or Shift keys.

☐ WordMARC

Type WM and hit Enter to get into the program. Select Edit from the initial menu by pressing the Execute key. You get the message: "Type the document name and press Execute or press the file key." Pressing the file key brings up a menu of existing documents. If you want to use a new document name, type that name in the directory and open up a file.

To create a new document, select the "Create a new document option." This presents you with a new menu that offers a selection of preprogrammed formats. The formats offered by the system are Letter, Memo, Manual (from scratch), TWX (teletype—all caps), Wide, ASCII, and No Specific Format. If you have customized and saved a format, that would also show up.

Select Manual to bring up the Edit screen. A conversational line, which gives a filename, the page number, and the screen number is on the top line. Directly below that are two lines used for entering commands and receiving prompts and recommended responses. Finally, there's a ruler line that indicates the right-hand margin and the line spacing. The default is 76:2—meaning the right-hand margin is at 76 and the line spacing is at two half-lines (that is, single spaced).

☐ WordPerfect

WordPerfect is essentially command driven with menus thrown in. The ten function keys and the top row of numbers are used in conjunction with the Shift, Alt, and Ctrl keys. Some commands get you into a menu and some are simply single commands. Others, such as the PRINT command, display an option line with three choices at the bottom of the screen. The 25th line of the editing screen holds a status display showing the document, page, line, and cursor position numbers. Like the other command lines and menus, this line is intensified. The Replace mode adds a replace toggle at the bottom of the screen.

☐ WordStar

In the editing mode, an information line on top of the screen specifies the logged disk drive; filename; page, line, and column numbers; and whether Insert and Margin Release are on or off (both can be toggled manually). There is also a ruler line with tabs, which can also be toggled. Edit commands are conveyed through Ctrl-key combinations. The page and line counts can be toggled to give you file character and line numbers.

☐ XyWrite II-plus

The working screen contains three lines at the top. Uppermost is the command line, from which you call all of the functions that cannot be performed with keystrokes from within the text. The middle line is the prompt line, which is where *XyWrite II-plus* gives you its messages, the name of the file you are editing, the page and line you are on (if desired), the status of the CapsLock and NumLock keys, whether you are in Insert or Overwrite mode, and

In 1947, 71 years after Alexander Graham Bell uttered the words "Watson, come here, I want you...," Bell Laboratories invented the transistor...and ushered in the Computer Age.

WATSON, WATCH US NOW!

AT&T INTRODUCES TH

For over 40 years, AT&T has been in the business of designing and manufacturing computers.

In fact, we've created the largest computer system in the world—our long-distance network—the one which enables you to make all those long-distance calls to your branch offices.

Today, we're proud to introduce a whole new line of flexible, compatible, reliable computers for business ...AT&T Computers.

THE FLEXIBLE FAMILY

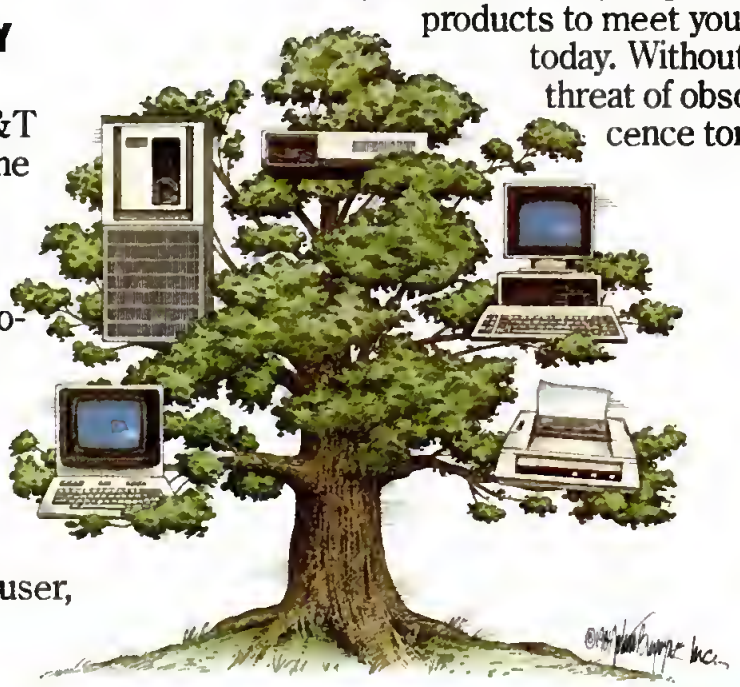
Meet the family.

The 3B2, 3B5 and the AT&T Personal Computer make up the new AT&T family of flexible business computers.

The AT&T 3B2 is one of the most advanced super microcomputers you can buy today. This 32-bit UNIX* System V-based super micro packs all the power of a much larger system in a size small enough to sit on your desk top. Because it's a multi-user, multi-tasking computer that can accommodate up to 18 terminals, it operates at a low cost per work station. That makes it perfect for offices where many people need desk-top computers and there's a need to accommodate growth.

For larger family gatherings, the AT&T 3B5 minicomputers make great hosts, because they can accommodate up to 60 users.

What's especially attractive about our family is that it will grow with you. No matter what size your company, it allows you the flexibility to pick specific products to meet your needs today. Without the threat of obsolescence tomorrow.



E NEW COMPUTERS.

And the family's open architecture means that our computers will be good company for your current hardware and software, thus protecting your investment.

No matter which AT&T Computer you buy, consider yourself part of the family.

ALL THIS AND A PC TOO

AT&T would also like you to meet the new AT&T Personal Computer. This exciting new member of our computer clan is perhaps the most flexible and compatible personal computer on the market today.

What makes the AT&T Personal Computer special is its ability to run most popular business software, including most available MS-DOS** applications. It operates as a stand-alone unit or as an intelligent work station in an integrated computer network.

And it combines high performance with excellent graphics capabilities and a high-resolution screen.

Moreover, costly options on some other PC's are standard features on the AT&T Personal Computer—features such as color graphics; serial and parallel ports; clock/calendar display; monitor pan and tilt, plus multiple expansion slots to add extra printers, memory and other plug-in options. All this is bound to make it your personal favorite.

YES, WE DO WINDOWS

If you have several stacks of work that you'd like to spread out and work on, AT&T has the perfect way out. It's called windowing. It allows you to divide your computer screen into four miniscreens. It enables you to print from one window, edit in another, draw a graph in a third and sort addresses in the fourth. With AT&T's windowing, you'll be able to see to everything at once.

When it comes to compatibility, the new AT&T Computers hit it off with each other...and most everyone else.

To begin with, our unique PC Interface

THEY GET ALONG

bridges the MS-DOS and UNIX Operating Systems, allowing you to use your PC as part of a larger 3B network.

All our computers are based on AT&T's Information Systems Architecture, an open, communications-based structure that can accommodate and integrate not only our products, but also those of other manufacturers.

UNIX SYSTEM V

We also have the UNIX System V Operating System, developed by AT&T Bell Laboratories. It's an operating system so flexible, it's rapidly becoming an industry standard. You won't have to discard equipment. Or waste time and money reprogramming every time a new computer comes along.

HARDWORKING SOFTWARE

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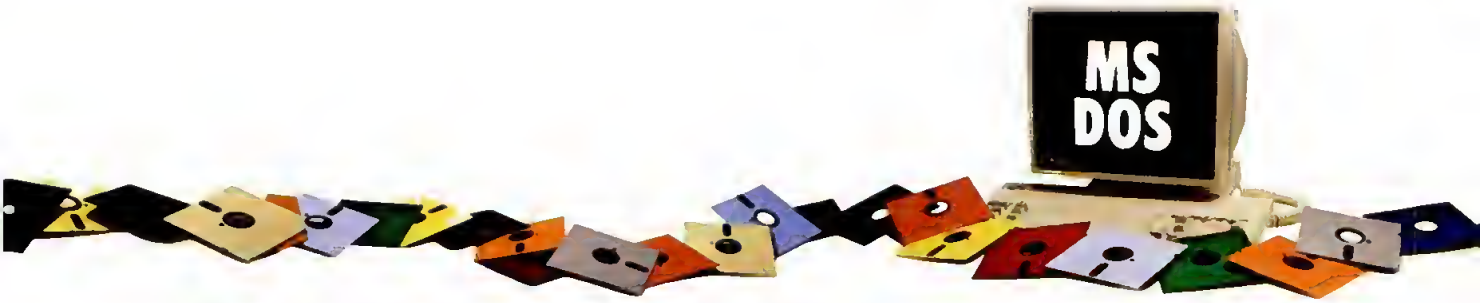

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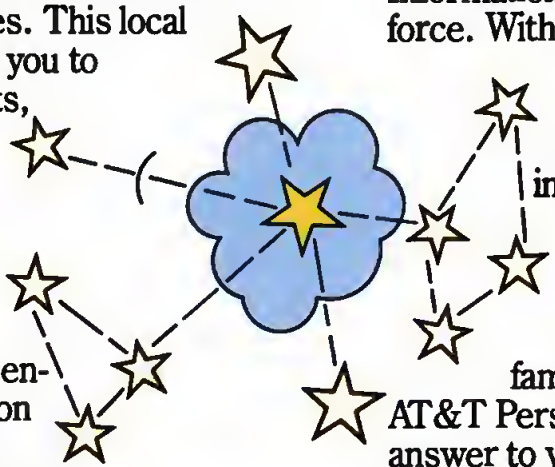

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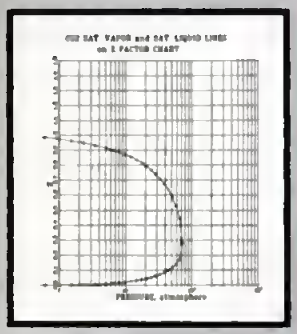
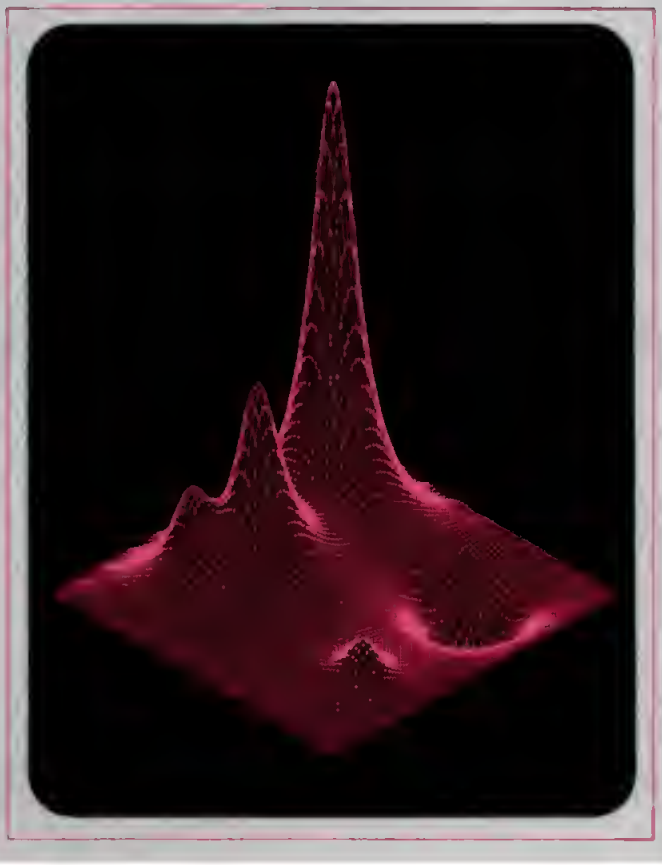
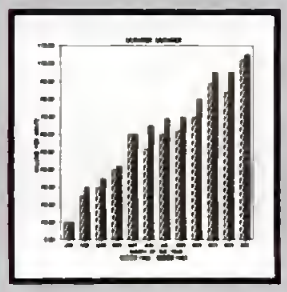


Scientific Plotting

Symbol Sets



Digitizing



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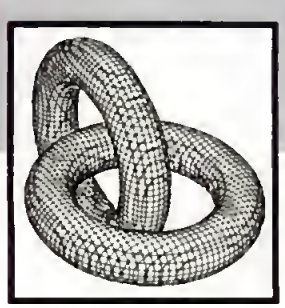

Program Output

Contouring

PLOTCALL is a graphics system that processes standard plotter instructions into a form that can be printed on over 20 dot matrix printers. This is not another print screen program; presentation quality graphics are created directly on the printer to achieve the maximum resolution possible. (120 x 216 dots per inch for Epson printers)

PLOTCALL includes 17 symbol sets for sign making and plot labeling. Symbol sets may be altered, or create your own! Character strings may be created from any symbol set, rotated to any angle, and scaled to any size.

Plots can be created from any language or from digitized data. An interactive plot debugging program allows you to preview a plot on the screen before sending it to the printer.

All plots in this ad were created with **PLOTCALL** on an Epson printer. No additional hardware is required, not even the color graphics card!

Also included are the following easy to use, interactive programs that utilize the **PLOTCALL** system:

SURF creates high resolution three dimensional surface plots with hidden line removal.

TOPO creates contour maps using the same data as **SURF**. **TOPO** uses the character routines in the **PLOTCALL** system to provide inline contour labels.

GRAFIT creates charts and graphs of all types – XY graphs, bar charts, pie charts, and line graphs.

IBM PC or compatible with a minimum of 128K of memory and a dot matrix printer with graphics option are required.

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whether you have set the program to automatically capitalize the first letter of each new sentence. The third line is the help line, which can display a ruler line showing the columns, tabs, margins, and cursor position; a clean straight line; or any of *XyWrite*'s three sets of function key reminders.

ADAPTATION TO PC

(continued from page 122)

writer, German characters from the extended ASCII set will display on the screen.

☐ **SELECT Bilingual**

The function keys are designed to insert ten different boilerplate phrases. No other function keys are mentioned or used.

☐ **Spellbinder**

Spellbinder's use of the PC keyboard seems to be too extensive, attempting to stuff a bewildering array of commands onto the ten PC function keys, whose meanings constantly change. The function-key legend at the bottom of the screen changes to match the configurations, but it's slow to update. In *Spellbinder's* Edit mode, it takes the better part of a second after pressing Esc for the new key meanings to update, and that will slow down a fast typist. *Spellbinder* veterans may find it faster to stick with the control-key sequences.

☐ **Volkswriter Deluxe**

The program is well adapted to the PC, and the only key not used is the Scroll Lock. Colors can be used for display of special printer effects such as boldfacing, and can be configured to taste. The extended character set can be edited either by entering the character using Alt and the numeric pad, or by customizing the keyboard using the KEYBD.IN file (a table of keyboard information that comes with the program).

☐ **WordMARC**

The program makes good use of the function, numerical pad, and Shift keys and special characters.

☐ **WordPerfect**

WordPerfect definitely makes efficient use of the PC and the PC keyboard.

☐ **WordStar**

WordStar makes effective use of both the keyboard and color once it has been installed for a color screen. The installation program, WS COLOR.BAS, allows you to tailor the program to taste.

☐ **XyWrite II-Plus**

The program makes extensive use of the available keys and key combinations on the PC. The function and keypad keys are used alone or in various combinations with the Alt, Ctrl, and Shift keys; the alphanumeric keys are used with the Alt key to generate stored program or text strings. The Ctrl-Alt combination is used with some alphabetic keys for search command wild cards and with the keypad to produce the extended ASCII characters. The Ctrl-alpha key combinations also generate many of the graphics characters. If you don't want the graphics, you can (as I have done) remap the keyboard to make the Ctrl-alpha combinations (or any other keys) execute any function or combination of functions that you choose.

TEXT ADJUSTMENT

(continued from page 124)

☐ **MultiMate**

To position the cursor, use the four arrow keys. Alt-F3 and Alt-F4 move the cursor to the beginning and end of the line. You can also move the cursor by word, line, sentence, and paragraph. To move cursor to the top and bottom of a file, use Home and End. A ruler at the top makes a "page" on the screen. Press F3 to center text, Shift-0 for manual underlining, Alt-0 for automatic underlining.

☐ **Palantir**

Since the default data entry mode is Change, just move the cursor to the 4 and type F. Then change mode to Insert by pressing the Ins key and type the letters *our*. Centering the heading is done by moving the cursor to the heading line and pressing F1 (set) and then pressing the left-cursor key. To indicate that the heading be underlined press F1 (set) and then the underscore character (_) with the cursor at the beginning of the heading, move the cursor to the end of the heading, and then press F2 (clear). Indicating boldface is done the same way, except that the exclamation mark (!) is used.

☐ **PC-Write**

Manipulating text is fairly easy in this program. The Backspace key at the top of the Return key on the keyboard is used to delete characters to the left of the cursor. Del at the bottom right does the opposite. Ins puts in spaces.

The text does not automatically realign, however. You press F7 to make that occur. Action is fast enough, though if you are used to automatic realignment you may find the adjustment hard to make.

☐ **Perfect Writer**

The End key takes you to the bottom of the file. The default writing mode is Insert. To choose overstrike or to write a line longer than *PW*'s 80-character maximum display, hit Esc for the main menu, O for Operations submenu, and M for the Mode options. Hit O for Overwrite or N for "no-mode." To continue editing, press Esc.

The Home key takes you to the top of the file, and Ins opens a new line for entering text. Note that *PW*'s default setting demands a blank line between paragraphs, although you can change nearly two dozen other settings using *PW*'s comprehensive configuration routine.

To center a line place the cursor on the desired line, call the main menu and strike A (for Appearance submenu), and then, in the following submenus, type L (for line) and C (for center). Or, you can place the embedded document-design command @@CENTER before the target passage.

Underlining can be accomplished through the menu chain, but striking Shift-F6, which underlines one word at a time, is faster for short passages. Boldfacing is done by typing the embedded @@B command and placing the target text in parentheses, or by going through a chain of submenus in the following order: Operation, Layout, Typestyle, Boldface.

☐ PFS:WRITE

Normally, *PFS:WRITE* is in Overtype mode. When in Insert mode, the cursor changes from a blinking underline to a blinking box. Home and End move to the ends of the file, PgUp and PgDn move a screenful, and the function keys move ahead or back a word, or to the beginning or end of a line. Del deletes the current character; Backspace deletes to the left. A status line at the bottom indicates the page and line you're on, and page breaks are shown by the boxes that simulate an electronic page.

F8 formats individual lines centered, left or right, so it's possible to have an entire file right justified, if you have the time and inclination to redo every single line.

To underline text, type the text in, then go back to the beginning, press Shift-F7 and hold the two keys down until the text is all underlined. Shift-F8 does the same with boldface. To undo underlining or boldface, you must retype the words.

All editing is done by function keys, which include: set tab stops, move left or right a word, label (define) blocks of type for duplication or removal, search and replace, format (align a single line left, centered, or right), append (add) another file, delete by word or line, and underline or boldface. The maximum character width per line is 78, and a document can be about 15 single-spaced pages. Back up a few lines, press Ins, add a word, and *PFS:WRITE* automatically adjusts the rest of the paragraph.

☐ ReadiWriter

Position the cursor using the cursor control keys. When the cursor goes off screen to the left or right, the view jumps 40 columns. When the cursor goes off the top or bottom of the screen, the view scrolls a line at a time. Enter adds a line and takes you to the beginning of it. PgDn and PgUp show you the next and prior 20 lines of text, respectively. Home takes you to the beginning of the current line, and End brings you to the end. You can also move the cursor to the top and bottom screen edges and to the first and last lines in the file.

Groups of lines can be centered using the :center tag to start and the :ecenter (end center) tag to end.

Three levels of highlighting are defined. When you set up your printer configuration file, you'll tell *ReadiWriter* what control character sequences the three levels correspond to. When you're entering text, surround the highlighted portions with "*:hpn*" and "*:ehpn*" tags (where *n* is 1, 2, or 3). On my system these come out as underlined, boldface, and underlined boldface.

☐ Samna Word III

Generally the program is pretty good about getting the cursor around the screen, although you can't page through a document by screenful. You have to move through a file either by paragraph or by page break. If you move by word or by sentence, the cursor will not stop at the end of the text, but will bounce past the end of the last line and end up in the first column of the (blank) line below. You have to fiddle with the arrow keys to get back into a position where you can start creating more text. The MOVE-BY-FILE command will put the cursor at the end of the last line of text, but it bumps the whole text up into the top quarter of the screen, so you can't see much of what you've already written.

Hit the plus sign (on the number pad) to get to the end of the file. Hit Shift-PgUp to move backwards one sentence to the "4." Type F in place of the 4, and the program will overwrite. Hit Ins to turn on Insert mode. Type the letters *our* and then hit Ins again to get out of Insert mode. The paragraph will automatically reformat.

To center, move the cursor to the title line. Hit F4, "highlight" the line, and press Enter. To underline, hit F1, highlight the line, and press Enter. To boldface, hit F8, highlight the line, and press Enter.

☐ SELECT Bilingual

Press X to enter data in Exchange mode (replace or overtype), move the cursor to the 4 and type F. Then press Esc to get back to the editing menu, press I to enter data in Insert mode, move the cursor after the F and type *our*. To center the heading, insert a line that says \JC immediately in front of it and a line that says \JN immediately after it. To highlight text, move the cursor to the beginning of the text, press U from the editing menu to invoke the USE command, press B for Boldface or U for Underscore (or both), move the cursor to the end of the area to be highlighted, and press Enter.

☐ Spellbinder

Overtype is the normal editing mode. To insert, press Ins and half the screen opens up as a yawning blank, even if you are inserting only a single character. Press Ins again and the text closes up. If you make a mistake inserting, go back and overtype the rest of the line or exit the Insert mode, and then re-enter the text. Cursor movement includes the cursor keys, PgUp and PgDn, End (end of the file), left side-right side of line (Home pressed repeatedly), center of the line (hit Esc and then F6), and back and forward (F9, F10) by the current text mode—a character, word, sentence, paragraph or mark—or by a specific number of lines.

To center, use a dot command, a period followed by the letter C and the text line to be centered. Groups of lines can be centered by reading the Y Table into text in the form of an extended dot-Y command and numbers corresponding to the Y Table settings. This technique also works for running margin changes, justification changes, and so forth, throughout the file.

Highlighting is controlled by the Y Table, too. You get a choice, which includes Underline, Doublestrike, Bold, Overstrike, but only one at any time. Unfortunately underlined boldface isn't possible. F7 and F8 turn the Enhance function on and off.

☐ Volkswriter Deluxe

To move to the beginning or end of the file, use Ctrl-Home (or press Home, Home, Home), or Ctrl-End (or Home-End). F3 toggles the cursor from the right to the left of the line, pressing Home twice takes it to the top left of the screen, End brings it to the bottom left of the screen,

Home and an arrow key puts it at the far edge of the screen, and Home with a down arrow moves the cursor to the bottom of the screen in the same column. To center lines, press Alt-F9, Shift-F9 to underline, and Shift-F7 to boldface.

☐ WordMARC

To select the end of the document, press 5 on the keypad, the bottom key and type the new paragraph. The line folded at the preset right margin. Then position the cursor on the 4 and hit the Ins key, type Four, hit the execute key (to close the inset), then do a forward delete to get rid of the 4. (WordMARC defaults to the Replace mode.)

Press the Shift keypad 5 simultaneously to get to the top of the document, hit the Ins key, and type "Lincoln's Gettysburgh Address," followed by two carriage returns. Hitting the Execute key closes up the insert.

At the bottom of the text, overtype the last *people* to *men*, then do a forward delete to get rid of the *ple*.

Then hit Shift and the keypad 5 simultaneously.

Return to the top of the document, (keypad 5) and overtype "Lincoln's Gettysburg Address" in all caps. No command to convert upper and lowercase is available in the Edit mode, although the Print mode has a feature that will force all characters to uppercase for printing purposes.

To move to the top of the page, place the cursor at the beginning of the title line, and press the Bold function key and Center function key. To boldface and underline, select the block to be acted upon by placing the cursor on the active text, then do a quick search for the end of the block.

☐ WordPerfect

Word Perfect is fairly adept at easily getting you to any point in the document. Depressing the Home key twice and then hitting the up arrow key takes you to the beginning of the document. Hitting the Home key twice followed by the down arrow key positions the cursor at the end of the document. A single hit on the Home key with the corresponding arrows takes you to the top and bottom of the screen. You can also move by word (Ctrl-4 and 5), screen, and page (Minus and Plus keys) in both directions. A GOTO function takes you to any page by pressing Ctrl-Home and then the page number.

☐ WordStar

To move the cursor to the beginning and end of the file, hit Ctrl-QR or Ctrl-QC, respectively. The cursor can be moved by character, word, line, or screen. Landmarks can also be embedded in the text. To center lines, hit Ctrl-OC. To underline, hit Ctrl-PS before and after the desired text. To boldface, hit Ctrl-PB in the same manner. Control characters on screen will indicate where the change has been made.

☐ XyWrite II-plus

When working in a file, you can not only enter the regular alphanumeric data, you can issue all editing commands and most character display commands with key combinations without leaving the text. (Text formatting commands are issued from the command line.)

Cursor moves are, with two interesting exceptions, controlled by key combinations without leaving the text. The keypad arrows alone move the cursor up and down a line or forward and back a letter. The Alt key with the horizontal arrows moves it a word at a time. Functions are available to move it a sentence or a paragraph at a time. Ctrl-Home or Ctrl-End move to the top or bottom of the file, and the PgUp and PgDn keys move up or down one screenful. In addition, you can give two commands (JUMP and GO) from the command line, and the cursor will jump to the indicated character of the file or go to the indicated page and line. All of these moves are essentially instantaneous, since *XyWrite* holds everything in memory (if you have enough); there are no delays, even with large files.

Entering highlighted text (such as underlined or boldfaced), subscripts or superscripts has been made extremely simple. If you are keying the text in for the first time, you hit one of the number keys with the Ctrl key and keep typing. Ctrl-2 is Bold, Ctrl-3 is Underline. When you want to return to normal mode, hit Ctrl-1. If the text to be highlighted has already been typed in, simply define the desired text and hit one of the Ctrl-number key combinations. These commands can also be implemented by going to the command line and giving one of the MODE (or MD) commands. The effect is the same in either case: program response is virtually instantaneous.

SEARCH AND REPLACE

(continued from page 128)

replacement to take effect and whether *Palantir* should automatically continue through the file replacing each found string. You can replace strings one at a time, replace a certain number of occurrences, or replace all strings found in the file. There is no command to change the case of a character string.

☐ PC-Write

Press the F9 key to enter the Find mode. The prompt in the status line at the top will ask for the string of characters to be searched for and the replacement string. To effect a search only, press the plus sign (+) key.

To replace the character string with the replacement string, press the F10 key. To effect a global search and replace routine, press Shift-F10.

☐ Perfect Writer

Place the cursor above the area to be searched, press the Esc key to call up the main menu, and choose the following options from the chain of submenus: Search, Replace, and Every One. *PW* prompts for both the search and replace strings in a highlighted window and makes the changes automatically. If search strings are entered in lowercase, the program will ignore the case of the target words; if search strings are entered in uppercase, the program will find exact matches only.

☐ PFS:WRITE

Press the F7 key and type the search

string. Choose either the Manual or Automatic option for replacing the string. If you choose the Manual option, the file scrolls along until a match is found, at which point you're asked if you want to make the change. *PFS:WRITE* matches whole words without regard to variations in capitalization. Searching for *country* also finds *Country* and *COUNTRY*. Wild card searches are possible by using two periods. For example, if you want to find word groups beginning with *country*, ending with *country*, or with *country* in the middle, your search string would be *country . .*, *. . country*, or *. . country . .*, respectively.

☐ ReadiWriter

ReadiWriter has neither search nor search-and-replace functions. To replace text you must re-enter it.

☐ Samna Word III

To change the last occurrence of the word *people* to *men*, move the cursor to the first letter in *people*. Press the Del key to get into Delete mode. Press the Home key to move the cursor forward by one word (this will "shade" the word *people*, that is, put it in reverse video). Press the Del key again to delete the word and then wait for the paragraph to reformat. Press the Ins key to get into Insert mode. Type the word *men*. Press the Ins key again to get out of Insert mode and reformat the paragraph.

To search for *country* and replace with *nation*, press F9, the letter S (for search), type COUNTRY, and press the Enter key. A menu with four options will appear on the screen. The Generic-or-Exact option gives you the choice of searching for any occurrence of the string, whether capitalized, boldfaced, italicized, and so forth, or of searching for the string as typed. In this case, choose Generic to be sure to pick up the occurrence of *Country* in which the letter *c* is capitalized.

The Any Occurrence/Whole Word option allows you to limit the search to whole words or to include strings that are embedded in other words. In this case, choose Whole Word.

The Replace (Y/N) option lets you tell the program if you want to replace the specified string with something else. In this case, press Y.

The Forward/Backward option lets you specify in which direction to search. Since you are at the top of the file, press F. (These option choices will remain the same after you specify a search procedure. If you don't need to make any changes, just hit the Enter key when the menu appears.)

The program then prompts you for the replacement string; you type the word *nation* and press Enter. Another menu appears with two replacement options. The Generic/Exact option lets you replace target strings either as they are found or exactly as the replacement string is typed. Choosing Generic replaces the capitalized occurrence of the letter *c* in *Country* with a capital letter *N* in the word *Nation*.

Assisted (Y/N) option gives you the choice of having the program do all the replacements at once or wait for you to approve each change. Press the N key. When you are finished with the options, you press Enter and the search and replace routine will execute.

☐ SELECT Bilingual

To start the search and replace routine, press R (for Replace) from the Edit menu. Enter the search string and press the Enter key. You are then asked for a prompt option. If you press the Enter key again, you will be prompted for each string found. If you press P, all found strings will be replaced. If you press P and enter a number, all found strings up to that number will be replaced. *SELECT* always ignores the case of the search string when making a search. The REPLACE subcommand is powerful and more than adequate. You can request a review of each change before it is made, or you can give a maximum change count. The case of the search string is ignored here, too.

☐ Spellbinder

While in the Edit mode, press F1 (to toggle from Edit to Command mode), then F8 (to call up the Text mode), then press the function key pertaining to the Search function you want. Then type the strings to be searched and replaced. The function choices are straightforward: Search, Search/Replace, Manual/Automatic, Once/Whole File, Whole/Partial Words, and Ignore/Distinguish between upper-and-lower case. Searches can be conducted from the cursor position to the end of the file, or through the entire file. Matches are underlined by the blinking cursor. *Spellbinder* does not preserve case—that is, it will not replace a capitalized word with a capitalized word, a lowercase letter with a lowercase letter, and so forth.

☐ Volkswriter Deluxe

Pressing the Alt-F7 key combination invokes the REPLACE command. The program asks "ALL? (Y/N)." If you want to conduct a global operation, press Y. The program will not ignore the case of a search string.

☐ WordMARC

Press F9 to invoke the SEARCH command. Answer the prompt "Search for what?" by typing COUNTRY and "Replace with" by typing NATION. Pressing the plus sign (+) key twice invokes the No-stop (global change) option. *WordMARC* will not preserve case in the one instance where a capital letter *C* appears in *Country*.

☐ WordPerfect

WordPerfect will execute search and replace routines with or without a Confirm option. Searches can be conducted in either a forward or backward direction. After each search, the last string searched for remains in memory. This way, the next time you ask for a search the string doesn't have to be entered again. To execute a search and replace routine, simply press Alt-F2 (for global operation) or Ctrl-F2 (for the Confirm option). Enter the search word or string and press the Esc key. The screen prompts you for the replacement string; after entering it, press the Esc key again.

☐ WordStar

To initiate a search and replace routine, press Ctrl-QA. The program asks you for the search string and what you want to

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replace it with. It also gives you a short list of options. For each replace, press Y (for yes) or N (for no). *WordStar* will not perform global operations unless you press G (for global search) at the list of options.

☐ XyWrite II-plus

There are four Search options: Search forward, Search backward, Case-sensitive, and Ignore case. There are also four Replace or Change options: Change all automatically (ignoring case); Change all automatically (case-specific); Change all (ignoring case, asking for verification of each one); and Change all (case-specific, asking for verification of each one). The command format is SE, SB, SEA, SEBA, CH, CV, CHA, or CVA followed by /string/ in the case of a search, or /string1/ string2/ for a change. The string separator can be any displayable character that is not included in either string (which means if your string contains a slash, you can use a different character). Wild card searches are possible, but wild card changes are not. The wild cards may include symbols for a number, letter, alphanumeric character, any ASCII character, or any string of up to 80 characters.

BLOCK MOVES

(continued from page 130)

with groups of lines, sentences, and even individual characters.

☐ PC-Write

Block moves, deletions, and copying are quick. To move a paragraph, place the cursor at the beginning of the paragraph, press F6 to mark it, hit Ctrl-PgDn to move to the beginning of the next paragraph, and hit F6 again to end the block. The text will be nicely highlighted in inverse video. Move the cursor to where you want to insert the block. Once there, press F4 and the move is made.

It is just as easy to copy or delete. All such copy manipulations begin with F6, which marks all text to be moved, and then you use F4 to delete (Shift-F4 brings your deleted material back) or F3 to copy.

Other text manipulation is simple. To get boldface, press Alt-B. A smiling face appears on-screen to mark the portion of text. (You can make the smiling face and other marks for special functions disappear by pressing Alt and the space bar.) You then go to the end of the text you want boldfaced and press Alt-B again. The same procedure is used with Alt-U for underlining, Alt-P for pica spacing, and Ctrl-P to force a new page. You can also change all lower-case letters to caps by using F8, and vice versa. There are other key combinations for transposing letters.

☐ Perfect Writer

To move a paragraph, place the cursor on it, call the main menu, choose the Cut submenu, and strike P for "paragraph." The paragraph disappears into the program's delete buffer, and a plus sign (+) appears on the status line to remind you. Move the cursor to the new location, type Esc for the main menu, and strike P for "paste." The paragraph is reinserted and the plus sign is canceled.

To move a sentence, place the cursor on it and follow the same procedure used to move a paragraph, but when the Cut menu comes up, strike S for "sentence."

☐ PFS:WRITE

Blocks of type are copied, moved, or deleted with the F5 key. Go to the beginning of the block, hit F5, and use the cursor to define the block, which will become marked in inverse video. To copy the block, press F6 (the Duplicate key), go to the new location, and press F6 again. To move a block, hit F5, define the block, and press the Del key (this takes an act of great faith the first time it's done) and the block disappears into a 35-line buffer. Press F6 after moving to the new location and the block reappears. If you accidentally put another block into the buffer, the first block is erased for good. For shorter deletions, use Shift-F5 or Shift-F6 to delete a word or line. Copying by column, or copying a block of text to another file, is beyond this program's abilities.

☐ ReadiWriter

ReadiEdit has no block capabilities.

☐ Samna Word III

Put the cursor at the beginning of the last paragraph. Hit the Del key to turn on the Delete mode. Hit the End key to "shade" the following paragraph. Hit Enter, and the shaded text will disappear. Then hit Shift-+ (the plus sign on the number pad) to move the cursor to the beginning of the file. Move the cursor to the new location and hit Ctrl-Ins; the paragraph will reappear after the cursor.

To reverse the order of the last two sentences in the document, hit the Del key to turn on the Delete mode and hit Shift-PgUp to "shade" the sentence in front of the cursor. Hit Del again to remove the sentence and get out of Delete mode. Hit Shift-PgUp again to move the cursor to the beginning of the previous sentence, and hit Ctrl-Ins to insert the deleted sentence after the cursor.

☐ SELECT Bilingual

Blocks are defined by moving the cursor to the beginning of the block, pressing P (for Pointer) from the editing menu, selecting a number from 1 to 8 (which will represent this particular point in the text), moving the cursor to the end of the block, pressing P from the editing menu again, and selecting another number to represent the end of the block. To move a block, position the cursor to the target area, press M (for Move), press the number corresponding to the beginning of the block, and press the number corresponding to the end of the block.

☐ Spellbinder

Blocks that correspond with any of the text modes (character, word, sentence, paragraph, or mark, which can be used for anything you want) can be moved. F6 rotates between the text modes, then Esc-F7 marks the text and sends it to a buffer, and Esc-F8 moves or copies the text. The text stays in the buffer until overwritten. To delete text, choose the desired text mode and press F8 (delete). *Spellbinder* politely asks, "Is this correct?" if the block is more than two lines. Other major changes, such as deleting the entire file from RAM, are preceded by the "Really?" prompt. Columns can be copied or

deleted by calling MOVEIT, one of *Spellbinder*'s macro files, and then answering the menu prompts. Another command allows the entire file or a specific number of lines to be written out or read in another file.

☐ Volkswriter Deluxe

To mark a block, use the F5 and F6 keys at the beginning and end of the file, respectively. Then press Alt-F6 to copy, Alt-F5 to move, or Alt-F8 to delete.

☐ WordMARC

Scroll down using the quick-scroll feature (PgDn followed by the Enter key). Press the Move function key and respond to the prompt by placing the cursor on the beginning of the paragraph. Then do a quick search for the next carriage return, which indicates the end of the paragraph. Press the Execute key, which generates the prompt "Move to where?" and move the cursor to the beginning of the text. When the Execute key is pressed again, the last paragraph will be moved to the beginning of the text. The above procedure is also swap the second and third sentences of the last paragraph.

☐ WordPerfect

Block moves are fairly straightforward. Press Alt-0 to define either the beginning or end of a block. Then move the cursor to the other end of the block and press Alt-9. Select the cut option from the submenu that appears, and then position the cursor where you want the text to be entered. Then press Alt-9 again and choose the Retrieve Text option; the block will be placed where the cursor is positioned. In addition, there is yet another option, and in this case marking the block is not necessary. Move the cursor to the sentence or paragraph that you wish to cut and paste, and press Alt-9. Choose the Cut or Copy option, and a submenu with Sentence, Paragraph, and Page options appears. By choosing one of these options you can get instant results.

☐ WordStar

Mark the beginning and end of a block with Ctrl-KB and Ctrl-KK, respectively. Move the cursor to where you want the new copy to appear, and hit Ctrl-KC to copy, Ctrl-KV to move, or Ctrl-KY to delete. Ctrl-KH will toggle the highlighting of the block.

☐ XyWrite II-plus

Text in general is copied, moved, or deleted by defining it and then giving the MOVE (F8), COPY (F7), or DELETE (Alt-F6) command. The following commands are for defining text: WORD (Alt-F4); LINE (F4); SENTENCE (Ctrl-F4); PARAGRAPH (Shift-F4); TEXTBLOCK (F1 at the beginning and end of the block); COLUMN (Alt-F1 at the beginning and end of the column). As with most of *XyWrite II-plus*'s functions, block moves are virtually instantaneous.

PARAGRAPH FORMATTING

(continued from page 134)

☐ PC-Write

To format a paragraph, first you insert a ruler at the top of the page by pressing F2. Mnemonic keys are used for the actual formatting: L sets the left margin, R sets right margin, P sets paragraph indentation, and T sets the tabs. You can even add a bell by pressing B.

Justification, which appears on screen, is accomplished with Shift-F7. Though the text doesn't realign after insertions and deletions are made, a quick press of F7 will realign it. Using F6, you can justify as many single lines as you wish simply by marking them.

☐ Perfect Writer

There are two ways to format *Perfect Writer*. You could alter each parameter separately by working through the appropriate menus and submenus. However, it is often preferable to use the @STYLE designator. Type

```
@STYLE
```

at the top of the file, followed by a command chain. In this case:

```
@STYLE (left margin 20
chars, right margin 60 chars,
indent 5 chars)
```

The program reformats a single paragraph when you use the FILL command from the menu or hit F9. It allows a preview of the entire text format when you use the @STYLE command and choose the Preview On Screen option from the Print menu.

The fastest way to get right justification is to precede the target section with the string @@STYLE (right justification is the command default). You can also justify with menus—from the Operations submenu, hit M for Mode, and from that submenu choose J for Justify.

☐ PFS:WRITE

Paragraph formatting in *PFS:WRITE* is entirely automatic—provided you don't get too tricky. Margins are set from the main menu's Define Page option. Then press F10, wait a few seconds, and the entire document is reformatted. However, the entire file must be one width. Tab stops are set by pressing F2, scrolling along the ruler line, and typing T or D for regular or decimal tab stops as needed.

☐ ReadiWriter

Paragraph formatting is done at text-formatting time by *ReadiWriter*. To indicate that you are starting a paragraph, use the :p. tag. You can set margins using `:set leftmar 10 linelen 65`, paragraph indent using `:set paraindent 5`, and justification using `:set justify on`. Groups of lines can be right aligned with

```
:right to start
```

and

```
:eright to end.
```

and there's a similar pair for left alignment.

☐ Samna Word III

To change the margins, first hit F7. This moves the cursor to the ruler on the third line. You then use the right and left arrow keys to move the cursor along the ruler. When the cursor is where you want it, hit L for left margin, R for right margin, T for tab stop, or N for numeric tab stop. (A numeric tab lets you enter a column of

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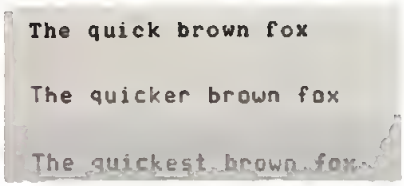

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numbers easily by lining up decimal points for you.)

Samna Word II automatically reformats as soon as you have done an insertion or deletion. This is annoying because you have to wait for the process to end before you can do anything else. If you have more than one deletion or insertion, you will quickly get ahead of the program.

There is no flush-right command. You would have to insert spaces at the beginning of each line to make it flush right.

☐ SELECT Bilingual

Paragraphs are not formatted on screen. To indicate how they should appear when printed, insert format codes in front of the first paragraph. For instance, to set margins at 20, 60, and 26 (for a first-line indentation), your format code line would say `\L20,R60,I26;` to indicate that spaces should be inserted to make the right edge of the text flush with the right margin, use the code \JR.

☐ Spellbinder

Formatting is accomplished by a Y table, so named because Ctrl-QY calls the formatting table, or menu. On the PC, it could also be called the F1-F10-F1 table, because that's the call sequence. The Y table controls page length, text lengths, left indent, line width, line spacing, margin justification, and proportional spacing. A YT table controls titles, page numbers, top and bottom margins, and odd- and even-page margins (page offset). A third menu sets tabs. A VERIFY command reformats text temporarily on-screen; final formatting occurs at print time. Help with hyphenation is also available.

☐ Volkswriter Deluxe

To set the margins, press F9 and move the cursor along the ruler to the new margins. Type a backslash (\) at the left margin, a slash (/) at the right margin, and a plus sign (+) for a tab stop. Press F9 when you're done. The program reformats on-screen; you press F8 for each paragraph to be reformatted. To produce a flush-right edge, press Ctrl-F1 to go to the format menu, modify the right justification, and press U to return to the text. The justification does not show up on-screen.

☐ WordMARC

To format text, place the cursor on the ruler bar and hit the Format key (Scroll Lock/Break). Margins are placed by moving the cursor to the left margin position and hitting the Indent function key and then moving the cursor to the right margin and hitting the Return Key.

☐ WordPerfect

Press Shift-F6 to get the Set Format option line, which lets you set the tabs, E-tabs, margins, spacing, and H-Zone. Select "margins," and you are prompted to enter the left, and then the right margins. Pressing number 3 shows you what has been previously set. All format settings are independent for each file, but toggles (such as automatic widow and orphan protection) must be set each time, or preset with the start-up program. For flush right hit F7, for centering hit F5, for underlining strike F8, and for boldface tap F6. Right-hand justification does not show up on the screen. To show embedded commands, press Shift-F2. You can then find them with the search command anywhere in the text and delete them with the Del key.

☐ WordStar

To set margins, hit Ctrl-OL for the left margin and Ctrl-OR for the right margin. The program reformats on-screen when given a Ctrl-B command. Ctrl-OJ toggles the right justification on and off.

☐ XyWrite II-plus

Formatting commands, such as margins (RM or LM), ragged left/right or centered (FL, FR, or FC), paragraph indent (IP), and so on, are all given from the command line with two-letter commands that embed a small bright triangle in the text at the place where the cursor was when the command was issued. This way, the screen is not cluttered with confusing alphabetic commands that are not actually part of the text. If you want to see what a particular triangle stands for, place the cursor on it, and the text of the command will be displayed on the prompt line. To see all of the commands on a particular screen at one time, go to the Expanded Screen mode by hitting Ctrl-F10. This instantly converts the screen to a standard, unformatted mode with all of the embedded commands written out, enclosed in European-style double brackets. You can then edit these commands directly, rather than having to delete them and re-enter them from the command line. Hitting Ctrl-F10 again converts the screen back to the formatted mode. Formatting commands can be changed at will; the text will reformat instantly, as when text is inserted or deleted.

SAVING THE FILE

(continued from page 136)

You can't change the name of a file that is already in the editor. You must save it under its current name (Press F1, then Enter) and then do a directory of the data disk (Press F1, D [for Directory], and Enter).

To rename the reformatted file to GETTYSBU.RG9, use the arrow keys to move the cursor under the old name of the file. Then hit F9, the plus sign (+) (on the number pad), R (for Rename), and then Enter. The program will prompt you for the new name for the file; type it in and press Enter.

☐ SELECT Bilingual

To save the file, you press Q (for Quit) from the editing menu and select the Keep option. You can't continue to edit the file after saving the file to disk. If you want to save the document under a new name you have to have given the new name when you issued the EDIT command.

☐ Spellbinder

Saving the file consists of both writing the file to disk and closing the file; other word processing programs do this as a single task. Novices may lose their text a few times until they figure out which of the 14 commands they need and when. Multiple saves will create a .BAK file.

☐ Volkswriter Deluxe

To save the file, press Alt-F10 go to the main menu and S for save. The program will ask if the filename is satisfactory.

☐ WordMARC

You can't save a file without exiting. Select the File function key, which will return you to the main menu. Select the RESAVE command. Next, select Edit from the menu, and the system will propose the correct filename. Press Enter and you'll be returned to the document. (*WordMARC* automatically saves every 12 or so lines and has a data recovery utility, so the save and resume feature need not be worked manually.)

Next, using the Move function key again, select the first paragraph. Then hit the File function key and go to the "move out" mode. I answered the filename prompt with "Gettysbu.rg1" and hit Enter, which saves the selected portion of the file.

☐ WordPerfect

To save a file press Alt-8 and give the name at the prompt; then press Return. Additionally, the last name you saved will automatically be remembered and displayed the next time you hit Alt-8. This way you don't have to keep typing in a long name each time you want to save a file. In this case, you will be prompted to enter a Y/N to the prompt "Confirm Replacement -----?"

☐ WordStar

To save a file without exiting, hit Ctrl-KS; to save it, exit to the main menu, and hit Ctrl-KD. To save it and exit to DOS, hit Ctrl-KX. If the file was opened in a document mode, *WordStar* stores information in the eighth bit, which can be confusing to other word processors. This can be avoided by using the nondocument Edit mode.

☐ Xy Write II-plus

To save a file, you have two options. To continue to edit after saving the file, enter SA (for Save) on the command line and hit F9 or Return. Since *Xywrite* does not remove commands from the command line after executing the command, your subsequent saves can be executed from within the text simply by hitting F9 whenever you wish. This makes it extremely convenient to do the frequent saves. If you want to save the file and stop working with that document, you enter ST (for Store) on the command line and execute the command by hitting either F9 or Return. With the program's default setting, it will create a backup file in either case; you can reset it so that no backup is made, if you wish. You can also do intermediate saves to another drive by adding the drive designation and the filename after the SA or ST command. To save a portion of a document to a different file, just define the portion and give the SA or ST command with the desired drive and filenames.

PRINTING THE FILE

(continued from page 140)

All the commands are embedded in the editing file and "read" to the print file. They number about three dozen standard commands, such as .M2, for example, which tells the printer that you want double spacing.

☐ Perfect Writer

Choose Print from the main menu or the Documents submenu, and *Perfect Writer* automatically saves the file to disk and displays a list of print options. The user specifies variables such as type of sheet feed, number of copies, and page numbering—*Perfect Writer* prints numbers centered at the bottom of the page—and type S to start printing. The single-space default is altered using @@STYLE commands followed by the desired line spacing in parentheses.

☐ PFS:WRITE

To print the file, choose the main menu Print option, change the defaults if desired, and press F10 to begin. If no file is specified, the text in RAM is printed. Top and bottom margins, single or double spacing, and headers and footers are entered via the Define Page option. Triple spacing and 1½-line spacing aren't possible. Page numbers are allowed in the footer but not the header; *PFS:WRITE* assumes a number in the footer is the page number and increments it by one per page. So, if you have a footer reading, "Marketing History of the BMW 320," the second page will read "Marketing History of the BMW 321." If your file is single-spaced, what you see on-screen is what you get; if it's double-spaced, the only way to preview page breaks is to print to disk and then view that file from DOS. Just about any printer works without special installation, since *PFS:WRITE* does nothing trickier than going over a line twice to underline or doublestrike a character. Fancier printer commands can be entered in with the text by typing

```
*PRINTER xx*
```

where *xx* is the ASCII code for a special printer feature.

☐ ReadiWriter

Request triple spacing by inserting into your text this format command

```
:set linespace 3.
```

To put the page number on the right of the header line, insert

```
:hr.Page *
```

after the first page has already started so that it won't appear on page one. Once you have finished inserting format commands (*ReadiWriter* documentation refers to these as *tags*) into your document with ReadiEdit or any other text editor, you can execute the *ReadiWriter* program using the name of your source file as the first parameter.

☐ Samna Word III

First, put a page-number marker in the text at the point where you want the page numbers to appear. Move the cursor to the top right-hand corner of the page and hit Scroll Lock, the number symbol (#), and Enter. The number symbol will appear at that point on the screen. To print, first save the file to disk. Then hit F3, the plus sign on the numeric pad, the name of the file to be printed, and Enter. You will now get a menu of print options. Select the Repage option to print the document in triple space instead of single spaced as it was on the screen. You also select the Print Page Numbers option and the More Options option to take you to the next print options menu. Here, you specify on which page to

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- One year Parts & Labor warranty

Options:

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Printer Port	$35
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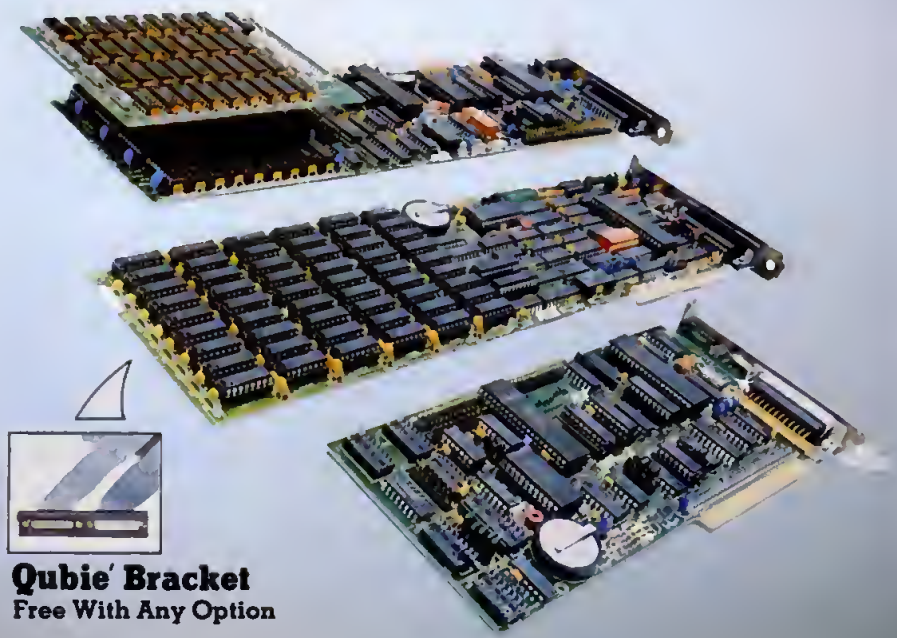

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start printing page numbers (page two) and hit Enter to print the file.

☐ SELECT Bilingual

To implement triple spacing, insert a \S3 format code at the top of the document. To define the header line, use a \H Page # format code after the first page has started so that headers will start appearing on page two. Printing the document is accomplished directly from the main menu after saving the file by issuing the P command and then specifying the name of the file to be printed.

☐ Spellbinder

Printing is done from the Print (F9) option of the Command mode. Before printing, the file is verified; page breaks and words needing hyphenation are displayed. Both verification and printing can be done a page at a time, for all text in memory, or for the entire file if some of it spills over onto disk. Page breaks, title locations, page numbering, and top-bottom and left-right margins are formatted from default values in the Y and YT tables, but defer to Y and YT commands embedded in the file. Verification shows how the document will look when printed. This is the only such view the user gets, since the look of the working file is unrelated to the finished document.

☐ Volkswriter Deluxe

To print the file, press P at the main menu. At the print menu, press P again for Print Using Current Format. To edit while printing, you must print to disk using the S (Select Printing) device and then W to write a disk file. Then exit the program and print using the DOS PRINT command. Then reenter *Volkswriter Deluxe*.

☐ WordMARC

Some of *WordMARC*'s print attributes are set on the Edit screen, and some are set from the print options list. On the Edit screen, you can set line spacing and right justification, however, you won't see the results until print time.

Triple space the text by placing the cursor on that part of the ruler bar, hitting the format key, typing a digit from the numeric pad (in this case, indicating six half spaces), and hitting Execute.

Then hit the File key, bringing up the Print menu. Select Options to set the print options. This brings up a complex menu for various printing options. Position the page anywhere in the document and follow it with a number sign. The number sign creates a command "Put the page here." Having set all that up, hit Execute, which takes you back to the Options list, and hit Save, which brings you back to the main menu.

The fourth item on that menu is Print or Review a document. Print will print as formatted. Review will scroll the document as it will appear printed.

To prevent page numbers from appearing on the first page, set up separate formats for the first and following pages.

☐ WordPerfect

Printing a file can be accomplished in a number of ways. Pressing Ctrl-PrtSc gives you the options to print the full text, print the page, or set print attributes.

Alternatively, you can print a different file or files directly from the disk. Also, each file is given a print job, and you can have the program print one document after another to one of two different printers. Background printing is always enabled, and you can work on your document while printing is in progress.

☐ WordStar

To print the file from the opening menu, hit P for Print. Alternatively, you could print the file while editing a document by using Ctrl-KP. This lets you print either the file you are working on or any other file.

☐ XyWrite II-plus

The actual printing of a file requires the entry of the TYPE command on the command line, along with the filename. If you want, you can add *n–n* to limit the pages that are printed. You can also add a P to make the printer stop and wait after each page is finished. If you want to preview the output in exactly the form it will be printed, with footnotes, headers, and footers in place, just hit Shift-F10 while the file is on the screen and tell the program whether you want the output file to be shown on a split or alternate screen.

The program creates a formatted file that can be edited further if needed. Care must be taken with the formatting at this point, since the output file has hard carriage returns at the end of each line. In fact, when you give the TYPE command, a temporary Print file is created in the same way, which means that your original text file is left completely intact for further editing at your convenience.

ERROR HANDLING

(continued from page 142)

☐ ReadiWriter

Error handling in *ReadiWriter*'s ReadiEdit program is adequate. In the main *ReadiWriter* program it is excellent. In most cases, you'll get a long English-language explanation of just what went wrong and a choice of several ways to proceed. Debugging your formatting codes is therefore simply a matter of listening for beeps and reading the screen.

☐ Samna Word III

If you open the drive door, you get the following message: "Drive B is not ready. Insert disk and touch any key to continue or cancel." Close the disk drive door, hit any key, and you can continue.

If you remove the program disk while you are editing, you will get the following message: "Drive A is not ready. Insert disk and touch any key to continue or cancel." As soon as you put the program disk back in, you can resume editing.

Data disks are trickier. Since *Samna Word III* is constantly writing to disk, if you are working on a file and take that disk out, the program gets confused and dumps you out to DOS.

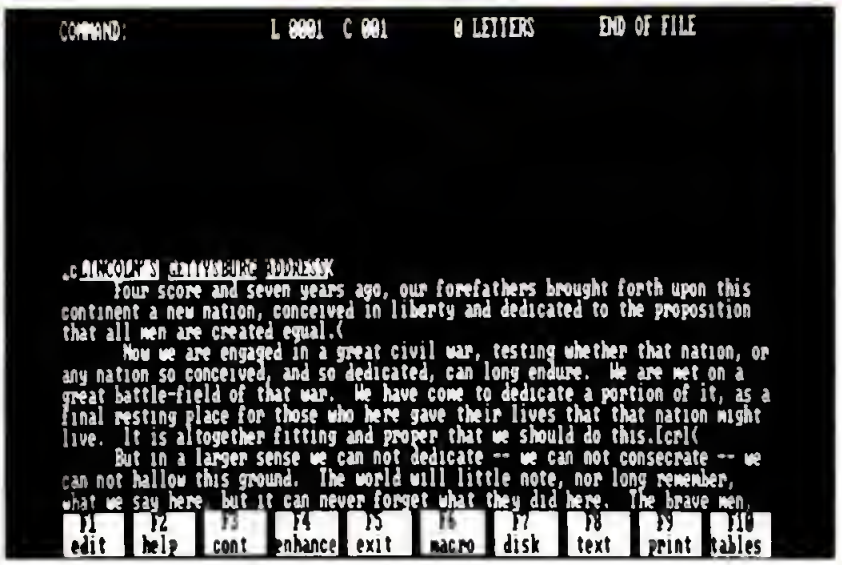
☐ SELECT Bilingual

Entering an invalid menu selection elicits a beep. In more complicated situations, short error messages appear and, at least in one instance, erase themselves after a few seconds. SELECT can recover from "out of space" errors, but not other common errors such as leaving the drive door open.

BANK STREET WRITER

Bank Street Writer **provides an unusual help screen when you press Alt-K: an on-screen graphic depiction of the most frequently used keys**

SPELLBINDER



The editing screen for *SPELLBINDER*. The status of the function keys at the bottom of the screen changes with the Edit and Command modes.

In the latter case, if you respond A to the DOS "Abort, Retry, Ignore?" message you will lose whatever file you were working on.

☐ Spellbinder

Error handling in *Spellbinder* could be better. Messages are cryptic, mistyped commands often are erased from the command line before you can see what they are, and inadvertent disk swapping can garble the document or even the whole disk. Running out of disk space isn't a fatal error, but you may lose one or two lines.

☐ Volkswriter Deluxe

When you enter an illogical command, the program beeps and prints "Beg your pardon?" The error message is self explanatory. In response to an I/O error, it beeps and displays "Drive B: not ready. Is door open/power off?—retry (Y/N)" Type Y and *Volkswriter* will resave.

☐ WordMARC

Erroneous subcommands are left on-screen so you can correct them. If you make an I/O error, *WordMARC* responds: "Drive not ready (Abort, Retry, Ignore)."

☐ WordPerfect

WordPerfect's error handling is quite good. Before you leave the word processor, you are asked if you want to save the document, and the program produces Y/N prompts in most areas where you are likely to do something you will later wish you hadn't.

☐ WordStar

An illogical command generates a self-explanatory error message. To recover from an I/O error (Abort, Retry, Ignore), you can close the door and choose Retry. If you choose Abort, you will be dumped into the system and probably lose your file.

☐ XyWrite II-plus

When you make a subcommand error, you get a beep and a self-explanatory message. If you make an I/O error, *XyWrite II* produces a "Disk error" message; then if you hit the key F5 to clear the command line, the program replies: "FILE exists—overwrite? Y/N." If you reply with N, it goes back to the normal state and you can clear the line and continue.

EXITING THE PROGRAM

(continued from page 146)

☐ Volkswriter Deluxe

At the main menu, type X for Exit. If you did not save the file, a prompt will ask whether you really want to exit. At this point, you can re-enter the *Volkswriter* program or exit to DOS.

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☐ WordMARC

Whenever you have an existing screen up, if you want to get out, you must hit the appropriate function key. It brings up a menu that has these options: Option (for printing); Refile this document as changed; No save this editing session; Save and name this document; Save this *WordMARC* document in an ASCII format; WM (save this document in a *WordMARC* format); and Return to editing session.

Assuming we're working on an old document, use the Refile option. If it's a new document, use the Save and name option. It asks you to type the document name and hit the key assigned to the Execute function. It then goes back to the original main menu. Select the EXIT command.

☐ WordPerfect

Press Alt-0 and you get a prompt "Save document y/n?" If you say no, you find yourself in DOS. If you say yes, you are presented with the original name, and you can save the document under that or any other name you wish to give it.

☐ WordStar

To exit from *WordStar*, you can either hit Ctrl-KX from the file, which will automatically save that file, or X from the main menu. Hitting Ctrl-KQ will quit the file without saving it and return you to the main menu; if you have made changes in the file, *WordStar* will ask you to confirm the exit.

☐ XyWrite II-plus

To exit the program, you give the QUIT command from the command line. If you have any files open at the time, the program will ask if you want to quit anyway as a reminder that you have not saved the active file.

BELLS AND WHISTLES

(continued from page 148)

and Replace function, and its automatic save.

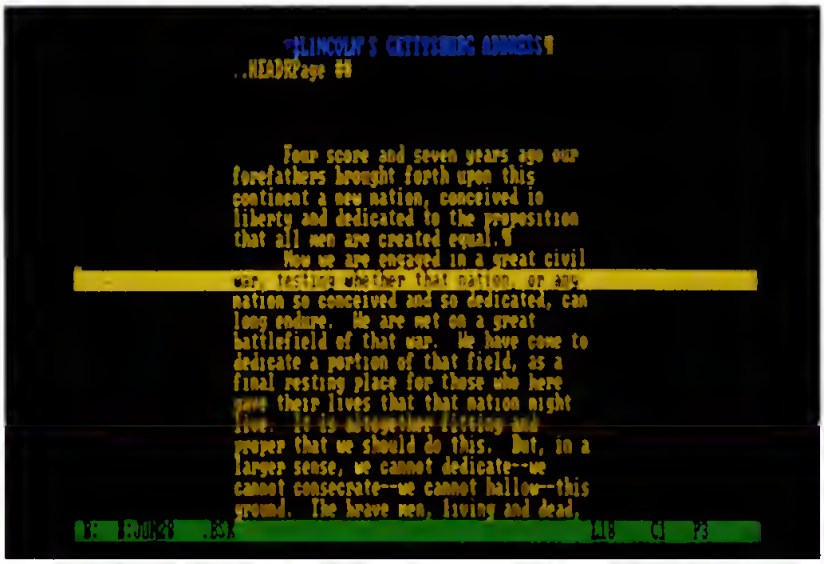
Overall, *Leading Edge* is a flawed package, but impressive for the price. If you're in the market for an inexpensive word processor, it's certainly worth a look.

☐ Microsoft Word

Microsoft Word incorporates the award-winning system used in Microsoft's *Multiplan*. *Multiplan* users will pick it up in minutes. For $100 extra, *Word* comes bundled with its own mouse.

Word is a well-thought-out, finely executed product, and it should prove to be highly competitive in the world of advanced word processing.

VOLKSWRITER 2.1

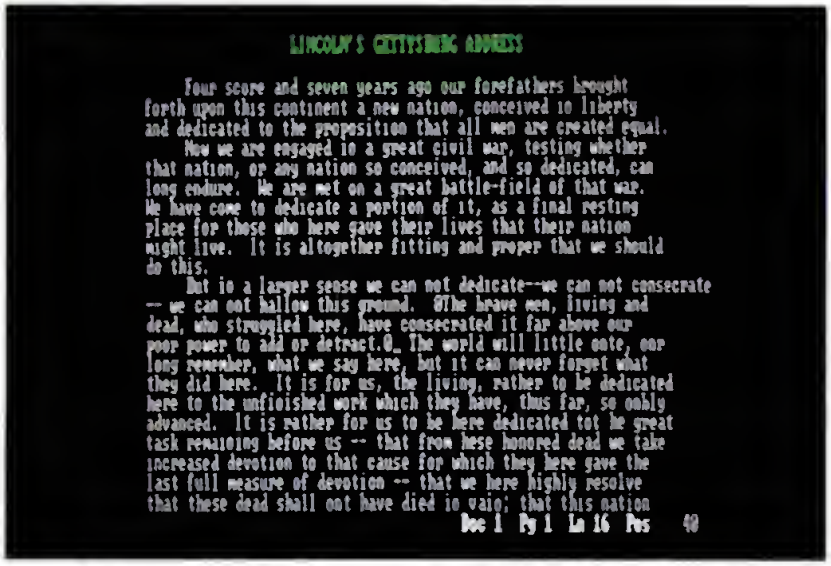


The editing screen for *Volkswriter Deluxe*. The yellow highlighted line across the center indicates a page break.

WORDMARC

The editing screen for *WordMARC*. Available commands are indicated on the keyboard by paste-on key labels.

WORDPERFECT



The editing screen for *WordPerfect*. The program uses the function keys and the top row of number keys for processing commands.

☐ MultiMate

MultiMate is the PC adaptation of the dedicated Wang Word Processor. Part of the Wang method was to take what we already did as writers and use the new computer technology to create something simpler, more comfortable, and more accommodating. *MultiMate*'s design so closely follows what you do when you use a pencil or a typewriter that a moderately experienced word processing user can boot *MultiMate* up and begin to work right away using the comprehensive, well-written help menu.

Nothing is perfect, however. Some of *MultiMate*'s characteristics irritate me. For instance, if you keep your finger on the cursor keys to scroll up or down a page, you can be suddenly launched to the next page when the cursor reaches the end of the copy. This feature is a pain and of little value, I think; I'd rather use the Ctrl and PgDn or PgUp keys to get to a different page.

In its latest incarnation, *MultiMate* is considerably slower than it used to be. Although I appreciate the added safety, I must say that I have had to find a completely new rhythm to my writing.

But those are petty objections to a program that is an undeniable industry standard for products of its type—dedicated word processors that support the process of writing.

Will Jones and his colleagues can indeed take credit for having the wisdom to let Dr. Wang's insight into the writing process stand.

☐ Palantir

Palantir is a powerful new product with a hopeful future. Its designers intend to conduct a "features war" in the months to come, to see whose package can do more things. You can expect to see automatic indexing and table of contents features in future releases. In my opinion, when a word processing program gets top-heavy it's time to divide it like an amoeba into text-editing and text-formatting phases. *Palantir*'s designers will have their hands full trying to support serious word crunching functions in an interactive setting.

☐ PC-Write

PC-Write does lots for its price—you can get it free or for as little as $10. Registering with Quicksoft is a good idea, however. Registration costs $75 and gives you the benefits of new updates as they occur, telephone hotline, and a printed copy of the manual—it's an unusual and interesting marketing concept.

PC-Write is very fast—moving copy from page to page is astonishingly fast because the program holds most of your file in a buffer.

PC-Write makes extensive use of DOS. It does not bypass DOS for file directories on your data disks, for example. It uses DOS commands such as COPY, RENAME, DISKCOPY, and FORMAT as an integral part of its program. You will find yourself moving back and forth into DOS more than with most other word processors.

I do not believe a word processing veteran would be able to learn *PC-Write* without using the manual. Command-driven word processing veterans would stand a bit of a chance, but in my opinion, even with the manual, the task of learning *PC-Write* is more challenging than that of many other word processing programs.

However, the program as a whole grows on you, and it is fun to use, especially in entering and editing text.

☐ Perfect Writer

Perfect Writer has a number of annoying defects. It makes poor use of the function keys, often assigning them trivial or peculiar commands instead of complex executions that are tedious to do with the menus. It desperately needs column, line, and page-location information on the status line. The program lacks automatic text realignment and will reformat only one paragraph at a time, returning the cursor maddeningly to the top of the paragraph. Its print program has trouble handling parentheses. And, although experienced users can bypass the menu displays by typing the initial letters of each menu choice from memory, many will find the system exhausting.

But for users who want extraordinary power and maximum ease of learning at a reasonable price, *Perfect Writer* is hard to beat.

☐ PFS:WRITE

If reliable, easily learned, no-frills word processing is what you need, PFS:WRITE may be the program to own. Most PC owners, if handed the *PFS:WRITE* disk and the card explaining the function keys,

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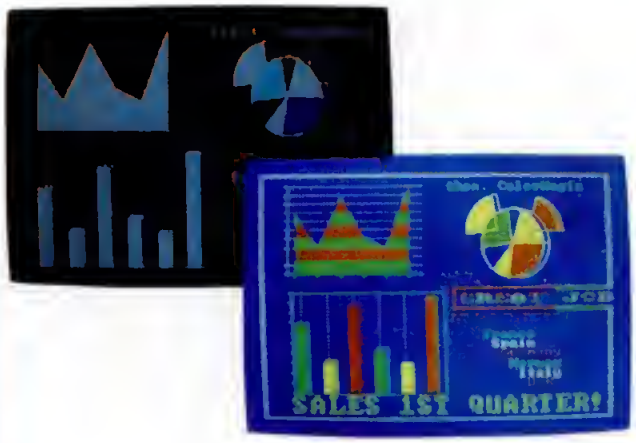

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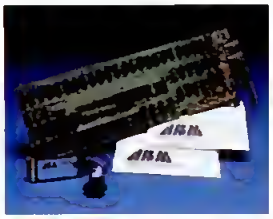

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could successfully compose, edit, and print letters and reports without ever cracking open the user's manual. It's that simple.

The main reason for this simplicity is the program's lack of bells and whistles. *PFS:WRITE* underlines, boldfaces (doublestrikes), automatically wraps too-long words down to the next line, moves blocks of text around, and searches and replaces. That's about it.

PFS:WRITE is an excellent choice if you can live with the limitations of 15-page documents and one-width margins of no more than 78 spaces. Buy this one for occasional typing functions. Look elsewhere to supply the word processing pool or write The Great American Novel.

☐ ReadiWriter

ReadiWriter is basically a text formatter and should be used with the text editor of your choice. It may seem like you're getting only half a product, but it's actually not very different from buying separate components for your stereo system. Superior text formatting is the goal of this program, and it achieves this goal splendidly. With powerful built-in capabilities for formatting footnotes, tables of contents, and indexes, *ReadiWriter* is ideal for knowledgeable users with professional word processing needs.

☐ Samna Word III

This program is loaded with features, is a breeze to learn, and gets good telephone support from its vendor. However, it fails in one vital area: text editing. First of all, editing is too slow. The cursor lumbers across the screen rather than snapping into position.

Another bother is automatic paragraph reformatting. After you insert or delete anything, you have to wait while the paragraph gets reformatted before you can do anything else—and reformatting takes about half a second per line. This is especially annoying if you want to delete a word or a phrase and replace it quickly with another.

The move-by-word and move-by-sentence cursor commands also have an irksome side effect. If you are creating text and have backed up to make a correction, you'd naturally like to shoot the cursor to the end of the text so you can go on writing. Crazily enough, if you move by word or by sentence, the cursor will not stop at the end of the text, but will bounce past the end of the last line and end up in the first column of the (blank) line below. You have to fiddle with the arrow keys to get back into a position where you can start creating more text. The move-by-file command will put the cursor at the end of the last line, but it bumps the whole text up into the top quarter of the screen so you can't see much of what you've already written.

People use word processors for different purposes and have different ideas about what makes a good one. But it's a shame to see so many excellent word processing features hung onto a text editor that's just not up to snuff.

☐ SELECT Bilingual

SELECT Bilingual is probably an excellent package for those new computer users who simply don't have the time or patience to learn very much about computers. It provides most of the word processing features ordinarily required in the business world and has an excellent and enjoyable tutorial program.

☐ Spellbinder

Spellbinder has a lot of rough edges along with many nice features. It desperately needs a manual that doesn't treat the PC and its function keys as an afterthought. A more transparent method of dealing with files and an on-disk tutorial would make *Spellbinder* much more attractive. But if you've got the time to sit down and really read the manual, and if polished, finished copy is what you want, *Spellbinder* could be a good choice.

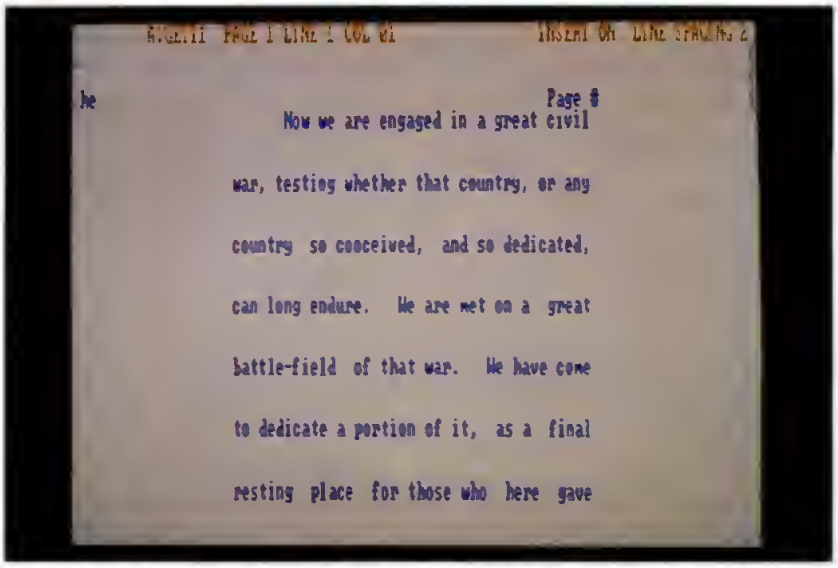
☐ Volkswriter Deluxe

I was one of the first users of the original *Volkswriter*, and I've been writing with it, in its successive upgrades, for almost 2 years. Its latest incarnation, *Volkswriter Deluxe*, is my favorite word processing program for the IBM PC.

Sure, I know there are programs with more features. Some let you edit several documents at once, or manage your footnotes, or even remind you to call your mother on her birthday. But for the basics—speed, reliability, and ease of use—it's hard to beat *Volkswriter Deluxe*.

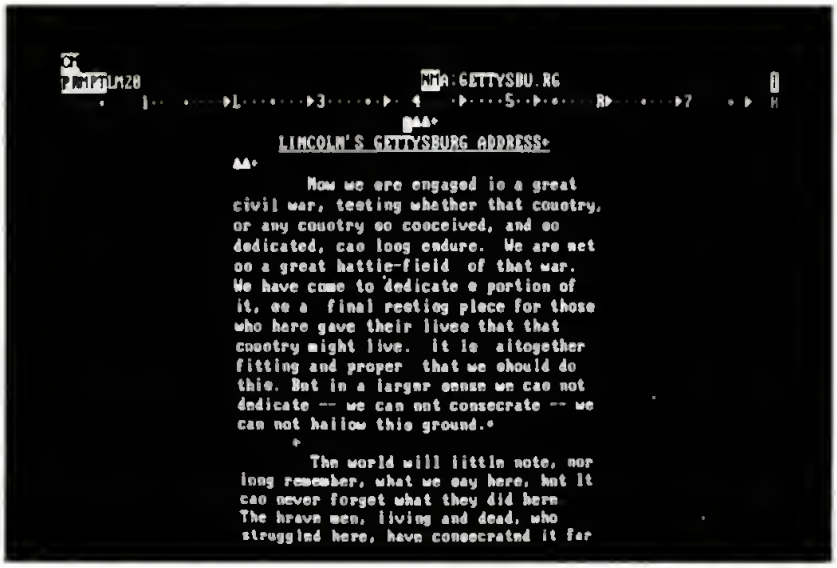
This isn't to say that *Volkswriter*

WORDSTAR



The editing screen for *WordStar*. If needed, a help menu can be called by changing the program's help level.

XYWRITE II-PLUS



The editing screen for *XyWrite II-plus*. The help screens can be accessed by hitting Alt-F9 and can be altered to suit the user's needs.

Deluxe is perfect. If pressed, I could pick a few nits. For example, I don't like the way it highlights the last line of each page in reverse video (on a monochrome display driven by a color/graphics adapter). I find that the glare of that line is hard on my eyes; I prefer the more subtle line of dashes *WordStar* uses to mark the end of a page. And I wish the program could calculate the right page breaks in a document containing both double- and single-spaced lines. You can specify this kind of mixed spacing, but the editor will display page breaks as if the entire document were single- or double-spaced. To see where the page breaks will really fall, you have to preview the output on your screen using the print menu.

A few advanced features would enhance this superior package. It *would* be nice to have windows and footnote management, for instance. But these are features I can do without, and because of its speed, reliability, and ease of use, *Volkswriter Deluxe* will probably remain my favorite for a long time to come.

☐ WordMARC

WordMARC is top-heavy with features such as encryption and multilingual prompts, but the package is light on sophisticated, document-related features such as screen formatting. *WordMARC* was obviously designed for a Fortune 500-type company that has dozens of workstations using various types of hardware. The makers really went for compatibility among CP/M and DOS systems at the cost of what seems to be the nice touches that can be found in many similar word processing systems. Whoever buys *WordMARC* is paying for a lot of compatibility-related features at the cost of important word processing features.

☐ WordPerfect

All in all, *WordPerfect* is absolutely stunning. I have had the opportunity to try out numerous word processing packages, and this is the one I have chosen for myself. It offers features such as horizontal scrolling, report generation, calculations, and a very powerful macro system. I am told that this fall we can expect new *WordPerfect* features such as table of contents and index generation, as well as a revamped spelling system.

☐ WordStar

WordStar has been around for so long, and in such a position of prominence, that nearly anyone who has even investigated word processing has at least a passing acquaintance with the program. Unfortunately, a "passing acquaintance" often translates as an "inadequate introduction," and there is a great deal of misinformation about *WordStar* that masquerades as common knowledge. Everyone "knows" that *WordStar* is difficult to learn, difficult to use, filled with arbitrary commands, and—the death blow—that it is an obsolete word processor that has fallen far behind the state of the art. According to one line of thought, the program survives only because *WordStar* users have been so traumatized in learning it that they refuse to try anything else. In short, it's a program that people love to hate. If the program were a person, it would be the machine politician who keeps getting reelected only because the opposition can't mount an effective campaign.

I beg to differ. I have been using *WordStar* for 3 years, and I have to admit that I *like* this much maligned program—and have from the beginning. Contrary to its reputation, I have found it easy to learn and easy to use. Granted, it lacks one or two nice features found in many similar word processing packages, but it still stands up point-for-point against such "advanced" programs as *Perfect Writer*, and *FinalWord*.

Ultimately, your choice of a word processor will depend on your own biases and on the type of writing you do. For me, though, *WordStar* passes the most important test: It stays out of my way and lets me get on with the job of writing.

☐ XyWrite II-plus

XyWrite II-plus is one of those rare programs that is so good that you almost have to go out and buy somebody else's program along with *XyWrite* in order to fully appreciate what you have. You have at your fingertips all of the functions that you would normally expect, plus features you would not have thought of but now discover you cannot do without. An earlier release of the program was recently reviewed in *PC* ("XyWrite Way to Go," Volume 3 Number 11). Since the time of that review the program has been expanded and improved even more. ■

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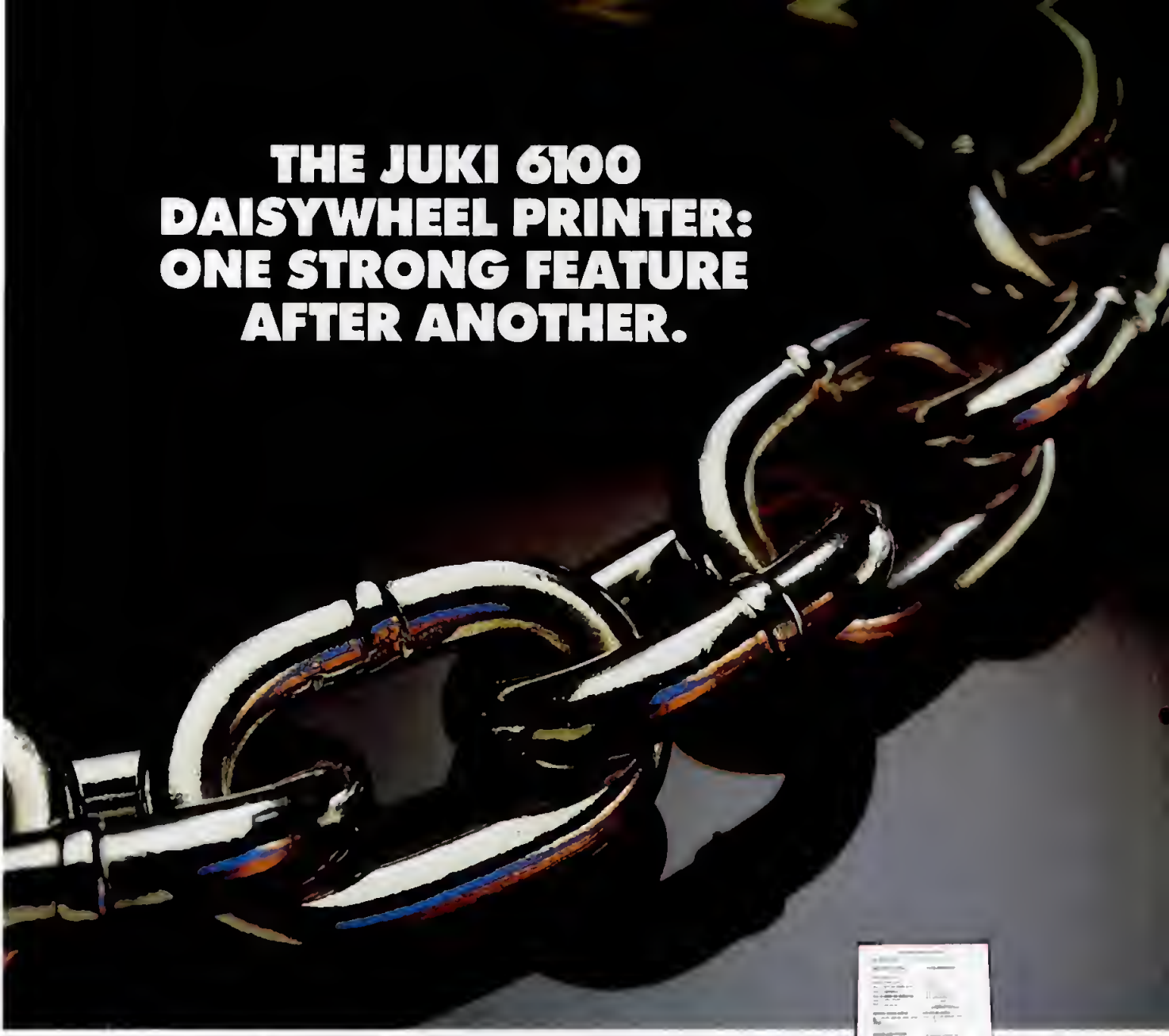

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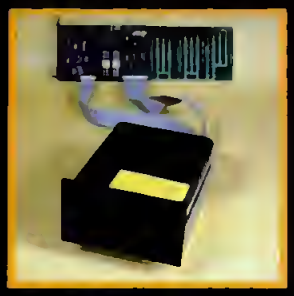

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BANK STREET WRITER
Broderbund Software
17 Paul Drive
San Rafael, CA 94903
(415) 479-1170
List Price: $79.95
Requires: 64K RAM, one disk drive.
■ **Reviewed by:** Jack McGarvey

CIRCLE 753 ON READER SERVICE CARD

EASYWRITER II SYSTEM
Sorcim/IUS
2159 Fortune Drive
San Jose, CA 95131
(415) 331-6700
List Price: $395
Requires: 96K RAM, two disk drives.
■ **Reviewed by:** William K. Howard

CIRCLE 752 ON READER SERVICE CARD

FINALWORD,
Version 1.15
Mark of the Unicorn, Inc.
222 Third St.
Cambridge, MA 02142
(617) 576-2760
List Price: $300
Requires: 64K RAM with DOS 1.1, 128K with DOS 2.0, two disk drives recommended.
■ **Reviewed by:** Jared Taylor

CIRCLE 751 ON READER SERVICE CARD

LEADING EDGE
Word Processing, Version 1.2
Leading Edge Products, Inc.
225 Turnpike St.
Canton, MA 02021
(617) 828-8150
(800) 343-6833
List Price: $100.
Requires: 128K RAM, two disk drives.
■ **Reviewed by:** M. David Stone

CIRCLE 750 ON READER SERVICE CARD

MICROSOFT WORD,
Version 1.1
Microsoft Corp.
10700 Northup Way
Box 97200
Bellevue, WA 98009
(206) 828-8080
List Price: $375, $475 bundled with mouse.
Requires: 128K RAM, one disk drive.
■ **Reviewed by:** Richard Aarons

CIRCLE 749 ON READER SERVICE CARD

MULTIMATE
Professional Word Processor, Version 3.22
MultiMate International Corporation
52 Oakland Ave. North
East Hartford, CT 06108
(203) 522-2116
List Price: $495
Requires: 256K RAM, two double-sided disk drives.
■ **Reviewed by:** Jack McGarvey

CIRCLE 748 ON READER SERVICE CARD

PALANTIR
Word Processor, Version 2.0
Palantir Software
7701 Wilshire Place, #110
Houston, TX 77040
(713) 520-8221
(800) 368-3797
List Price: $395
Requires: 128K RAM, two disk drives.
■ **Reviewed by:** Dean Hannotte

CIRCLE 747 ON READER SERVICE CARD

PC-WRITE
Quicksoft
219 First Ave. North, #224
Seattle, WA 98109
(206) 282-0452
List Price: This is a "shareware" program. Cost is $10 plus a $75 registration fee, which entitles the buyer to (among other things) free updates.
Requires: 128K RAM, one disk drive (can edit 8K worth of files with 64K RAM).
■ **Reviewed by:** Jack McGarvey

CIRCLE 746 ON READER SERVICE CARD

PERFECT WRITER,
Version 2.0
Thorn EMI Computer Software Inc.
3187 Cirway Ave.
Costa Mesa, CA 92626
(415) 527-2626
List Price: $199
Requires: 128K RAM, two disk drives recommended.
■ **Reviewed by:** Curt Suplee

CIRCLE 745 ON READER SERVICE CARD

FACT FILE

PFS:WRITE
Software Publishing Corp.
1901 Landings Drive
Mountain View, CA 94043
(415) 962-8910
List Price: $140
Requires: 128K RAM, one single- or double-sided disk drive.
Reviewed by: William K. Howard
CIRCLE 744 ON READER SERVICE CARD

READIWRITER,
Version 2.0
ReadiWare Systems, Inc.
P.O. Box 680
West Reading, CT 06896
(203) 431-3521
List Price: $125
Requires: 128K RAM, one disk drive.
Reviewed by: Dean Hannotte
CIRCLE 743 ON READER SERVICE CARD

SAMNA WORD III
Samna Corp.
2700 NE Expressway, #C700
Atlanta, GA 30345
(800) 241-2065
List Price: $550
Requires: 256K RAM, DOS 2.0, two disk drives.
Reviewed by: Jared Taylor
CIRCLE 742 ON READER SERVICE CARD

SELECT BILINGUAL:
The Spanish/English
Word Processor, Version 1.00
Select Information Systems
919 Sir Francis Drake Blvd.
Kentfield, CA 94904
(415) 459-4003
List Price: $395
Requires: 128K RAM, two disk drives.
Reviewed by: Dean Hannotte
CIRCLE 741 ON READER SERVICE CARD

SPELLBINDER,
Version 5.30
Lexisoft, Inc.
P.O. Box 1378
Davis, CA 95617
(916) 758-3630
List Price: $495
Requires: 64K RAM, two disk drives recommended.
Reviewed by: William K. Howard
CIRCLE 740 ON READER SERVICE CARD

VOLKSWRITER DELUXE,
Version 2.1
Lifetree Software Inc.
411 Pacific Street, #315
Monterey, CA 93940
(408) 373-4718
List Price: $295
Requires: 128K RAM, two disk drives.
Reviewed by: Dara Pearlman
CIRCLE 739 ON READER SERVICE CARD

WORDMARC, *Version 4.1*
MARC Software International, Inc.
260 Sheridan Ave.
Palo Alto, CA 94306
(415) 326-1971
List Price: $495
Requires: 256K RAM, two disk drives.
Reviewed by: Richard Aarons
CIRCLE 738 ON READER SERVICE CARD

WORDPERFECT, *Version 3.0*
Satellite Software International
288 West Center
Orem, UT 84057
(801) 224-8554
List Price: $495
Requires: 128K RAM, two disk drives recommended.
Reviewed by: Mark Harris
CIRCLE 737 ON READER SERVICE CARD

WORDSTAR 3.3
MicroPro International Corp.
33 San Pablo Ave.
San Rafael, CA 94903
(415) 499-1200
List Price: $495
Requires: 64K RAM, two disk drives recommended.
Reviewed by: M. David Stone
CIRCLE 736 ON READER SERVICE CARD

XYWRITE II-PLUS
XyQuest Inc.
P.O. Box 372
Bedford, MA 01730
(617) 275-4439
List Price: $295
Requires: 128K RAM, one disk drive.
Reviewed by: Peter Weil
CIRCLE 735 ON READER SERVICE CARD

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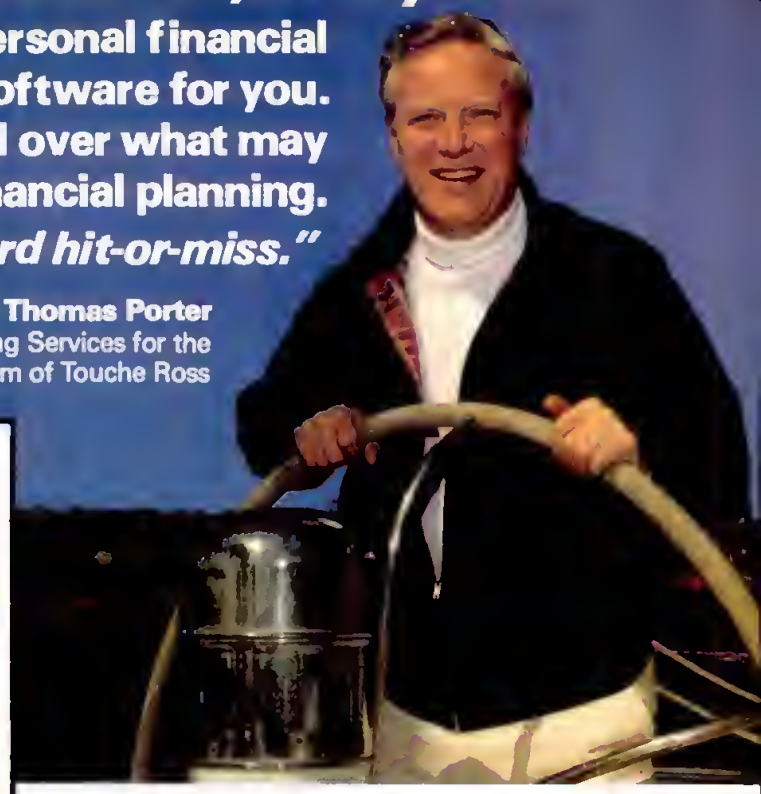

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By Larry Joel Goldstein and Martin Goldstein

An updated and expanded version of what has become the classic self-study book for the IBM PC, this book is a must for your computer library. New chapters on BASIC emphasize the importance of structuring and planning programs and important new imformation on debugging. Games and graphics are included and the section on random access has been expanded. It includes DOS 2.0.
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This book for the layman presupposes no knowledge of BASIC and clearly translates the BASIC reference manual supplied with the IBM PC into completely comprehensible terms. Organized by BASIC programming statements, it allows the user to go directly to the desired information without confusion or delay.
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IBM PC/XT ASSEMBLY LANGUAGE: A GUIDE FOR PROGRAMMERS
By Leo J. Scanlon

This volume is an introduction to the fundamental principles of microprocessors (specifically the 8088), numbering systems and assemblers. It first outlines the steps necessary to create and run assembly programs. Then it describes in detail, the instruction set of the 8088 microprocessor.
1983/384pp/paper/ISBN 0-89303-241-7/$19.95
Book/Diskette Package ISBN 0-89303-535-1/$49.95

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CIRCLE 175 ON READER SERVICE CARD

An Attaché from Down Under

Attaché Software enjoyed tremendous success in Australia with its line of accounting software. Now the company has moved its headquarters to the United States and is courting major U.S. accounting firms in an attempt to garner a slice of the accounting software pie.

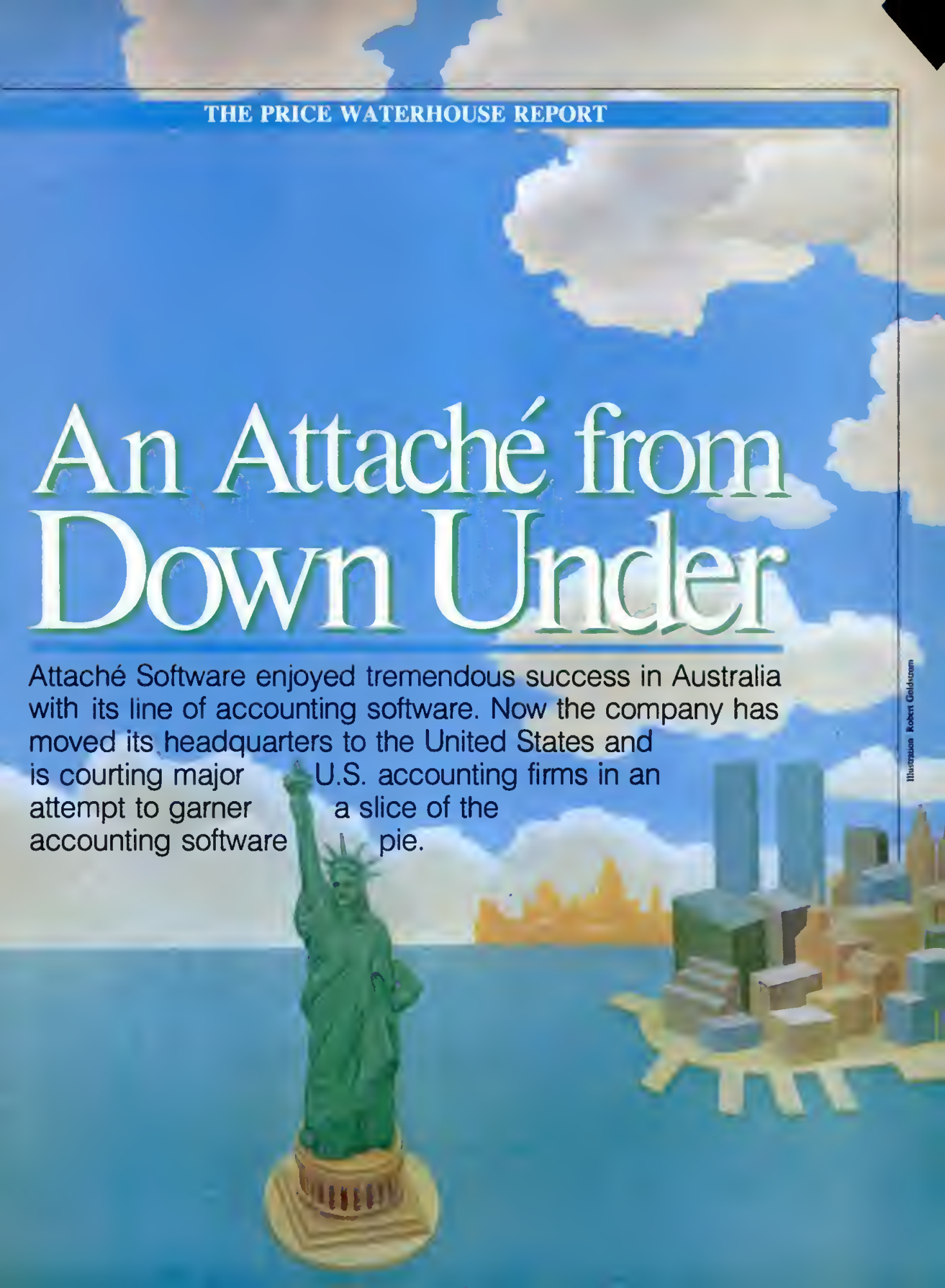


Illustration Robert Goldstrom

ATTACHÉ

At the Winter COMDEX show last February, the PC software industry welcomed a new U.S. company and a new line of accounting software into the mix. Attaché Software, Inc., introduced *Business Pack I* and *Business Pack II*, a series of five accounting modules that are aimed at the general accounting needs of small businesses.

The name "Attaché" comes from the distinctive packaging of the products. The software comes in two simulated leather attaché cases, complete with combination locks. One case contains *Business Pack I*, which includes the *Accounts Receivable*, *Invoicing/Sales Analysis*, and *Inventory Modules*. The second case contains *Business Pack II*, which includes the *General Ledger* and *Accounts Payable* modules. To get the software out of the cases, you call a toll-free number and someone at the other end tells you the combination for the locks. It's not clear why Attaché grouped the packages as it has. Each module can operate independently and can be purchased separately, although you receive a discount when purchasing them in a *Business Pack*. Unfortunately, the *Business Pack I* modules don't contain automated interfaces to the *General Ledger;* only the *Accounts Payable* system can be so integrated. However, Attaché expects to issue an update this summer that will allow all the modules to be integrated with the *General Ledger*.

PC

Business Pack I
Business Pack II
Attaché Software, Inc.
4251 Plymouth Road
Ann Arbor, MI 48105
(313) 663-1166
List Prices: *Business Pack I;* $1,425 (consists of *Accounts Receivable*, *Invoicing/Sales Analysis*, and *Inventory Control* modules).
Business Pack II; $1,095 (consists of *Accounts Payable* and *General Ledger* modules).
If purchased separately, modules cost $595 each.
Requires: 128K RAM, two disk drives or a hard disk, MS-DOS 2.0 or later, 132-column printer or an 80-column printer with compressed print.

CIRCLE 769 ON READER SERVICE CARD

Up from Down Under

If this family of accounting packages is foreign to you, you're not alone. Until recently, Attaché was virtually unknown in the United States. The software was developed in Sydney, Australia, several years ago and debuted in the United States at COMDEX in Los Angeles last February. At about the same time, Attaché moved its corporate headquarters to Ann Arbor, Michigan, and from this new vantage point the company is formulating plans to attack the American market.

Attaché's approach couples an easy-to-use product line with a uniquely aggressive marketing plan. While marketing the software in Australia, the company concluded that a comprehensive accounting system (even a micro-based one) requires accounting and financial expertise for proper installation and implementation. Attaché therefore aligned itself with a consortium of Australian accounting/consulting firms to assist customers with the implementation of the packages. From a marketing standpoint, the arrangement worked well; Attaché's software went on to become one of the most widely installed micro-based accounting systems in Australia. To top it off, IBM took note and agreed to market the Attaché packages through its Australian retail outlets.

Hoping to follow this success with a coup in the United States, Attaché has already secured marketing agreements with several major hardware manufacturers. The product will begin to appear on retail shelves this summer. The company also has a far-reaching plan to introduce its product to the major accounting/consulting firms in the United States. It intends to set up regional training centers for the consultants—a convenience for the accounting firms and for Attaché itself, since this will likely reduce the company's direct support requirements. There is also a promise of hot-line technical support for the consulting and dealer communities. Further, Attaché is planning an extensive program with community colleges and is hoping to encourage the hardware manufacturers to contribute equipment to the colleges.

Marketing strategies aside, here's a look at the packages themselves.

General Ledger

We'll first examine the core of Attaché's packages, the *General Ledger* and *Accounts Payable* modules, which comprise *Business Pack II*.

The *General Ledger* handles the conventional financial recordkeeping function, allowing you to create and maintain a general ledger, customize your chart of accounts, enter accounting transactions, and produce the necessary audit trail listings and financial reports. When setting up your system, you must decide how you want to structure your chart of accounts, whether to use 12 or 13 periods, and so forth.

Figure 1 illustrates the screen on which you specify the parameters of the general ledger. Note that, while the account code allows for only eight alphanumeric characters, it may be formatted into three segments—division, account, and subaccount—in any combination. With a structure like this, the general ledger package could even be used independently as a job-costing system. Although the system is capable of handling only a single company, multiple ledgers can be maintained on separate data diskettes or hard disk volumes. The system allows for seven different reporting periods ranging from one annual to thirteen 4-week periods.

With the Management Accounting function (part of the *General Ledger* module), budget data can be entered for selected accounts through the use of one of eight methods. This is one of the most flexible budget-development capabilities that

Attaché's software was developed in Australia several years ago and debuted at COMDEX in Los Angeles last February.

we've seen in a PC-based package. While the versatility of the budgeting features is not matched by the other features of the system, the budget input options are worth mentioning. The following options are available:

- An annual amount is entered and then automatically divided equally among the periods;
- A first-period amount is entered and then automatically repeated for the other periods;
- A first-period amount is entered and subsequent periods are escalated by a percentage or amount for each period;
- First- and last-period amounts are entered, and amounts for intervening periods are automatically interpolated;
- Each period is entered explicitly;
- A given amount is applied to a range of periods;
- An annual amount is entered and a specified percentage of that amount is applied to each period; or
- An across-the-board percentage increase over the previous year is divided equally over the periods.

Account creation and rudimentary report formatting can be handled with a single input screen for each account. A sample of the resulting master file of data associated with an account is illustrated in Figure 2, using a hypothetical company called 19H Enterprises. Because this file serves both as a Chart of Accounts and a Report Format file, report-formatting features such as subheadings and underlining must be given account numbers. This is a bit clumsy, but Attaché tells us that the problem will be taken care of in a forthcoming update.

The report type indicates whether the account shows up on the balance sheet or income statement, which are the only financial reports generated by the Attaché system. An account type (selected from among eight options) must be stipulated to control how an account item will show up in the reports. This designation also assists in transaction processing by preventing accidental entries to inappropriate accounts. For example, when processing cash disbursement transactions, the program will request a Type 3 account (bank account) for posting cash debits or credits for double-entry accounting purposes. You can also specify whether each account balance is usually a debit or credit amount, which helps when processing journal entries.

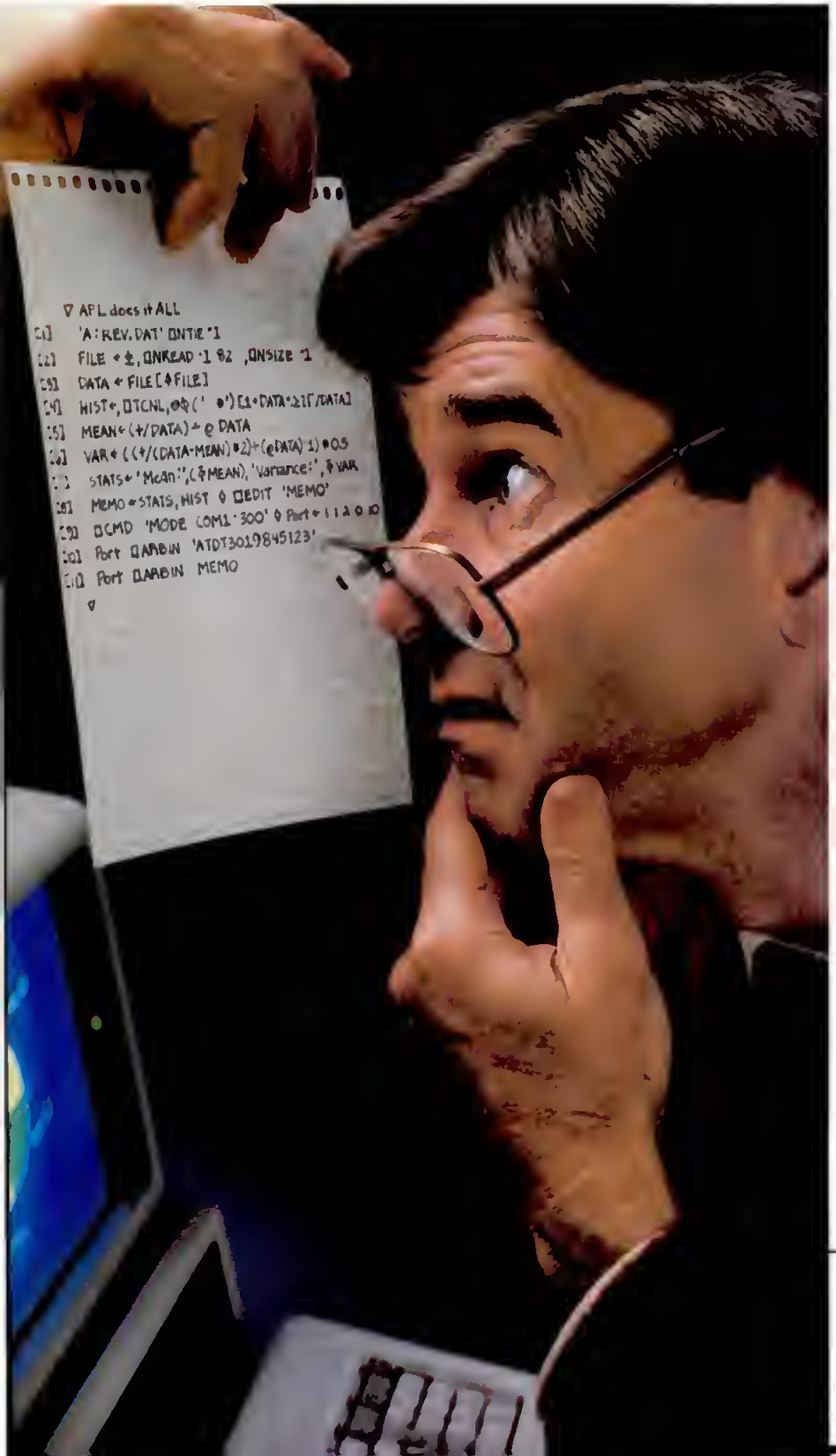
The Add-to Accounts field performs the task of accumulating account balances that will show up as part of a subtotal row on the reports. In Figure 2, for example, balances in accounts 1.1481 and 1.1482 will "add-to" each other to come up to the subtotal in account 1.1490 (Total Other Assets). Percentage codes allow any line item to be reported as a percentage of some base amount (sales or total stockholders' equity, for example).

The Paired Account field permits similar accounts to be netted against each other so that only the net balance will be presented in the reports. In Figure 2, account 1.1130 (Cash in bank) is paired with account 1.2030 (Bank overdraft); as a result, the balance sheet report will present the net cash position.

The transaction processing (journal entry) function bears mentioning for several reasons. Transactions are processed in batches; each batch contains transactions of only one type (that is, cash disbursements, cash receipts, and the like). Control totals can be entered to help you ensure the accuracy of the data that has been entered. Incidentally, batch report printing can be deferred, but eventually an audit trail must be produced before closing can occur. The number and value of deleted transactions is retained and noted on a batch summary report.

As transactions are input, they are immediately posted to both a Transaction Master file and the current Management Accounting file. The Management Accounting file contains both current period and year-to-date budget information, as well as current period transactions. This can provide you with an up-to-the-minute trial balance and allows you to edit

Tell this to your PC and see what happens.



No, it won't roll over and play dead. While the funny-looking symbols might not make immediate sense to you, to a PC equipped with STSC's APL*PLUS®/PC System they tell an amazing story. fn just 11 lines this program describes a sequence of events that can't be accomplished by any other single software package.

The program is written in an application development language called the APL*PLUS/PC System. Briefly, here's what it does. First, it sorts a DOS file containing revenue data and plots the revenues as a histogram. It calculates mean and variance revenues. Then with the help of a full-screen editor, it creates a memo combining the histogram, statistics and descriptive text. Finally the program issues a DOS command to the PC, dials a host computer, and electronically mails the memo. All in just 11 lines. No wonder a *PC Magazine* reviewer reacted to our APL*PLUS/PC System with "awe and delight" (March 1983).

If you want to integrate existing software or create custom solutions to problems that can't be handled by the software you're currently using, you need the APL*PLUS/PC System. It costs $595.00, and runs on the IBM PC with 192 KB of RAM as well as on a number of compatible machines.

To order the APL*PLUS/PC System or to receive your free convincer kit, write or call STSC, Inc., 2115 East Jefferson Street, Rockville, Maryland 20852. (301) 984-5123.

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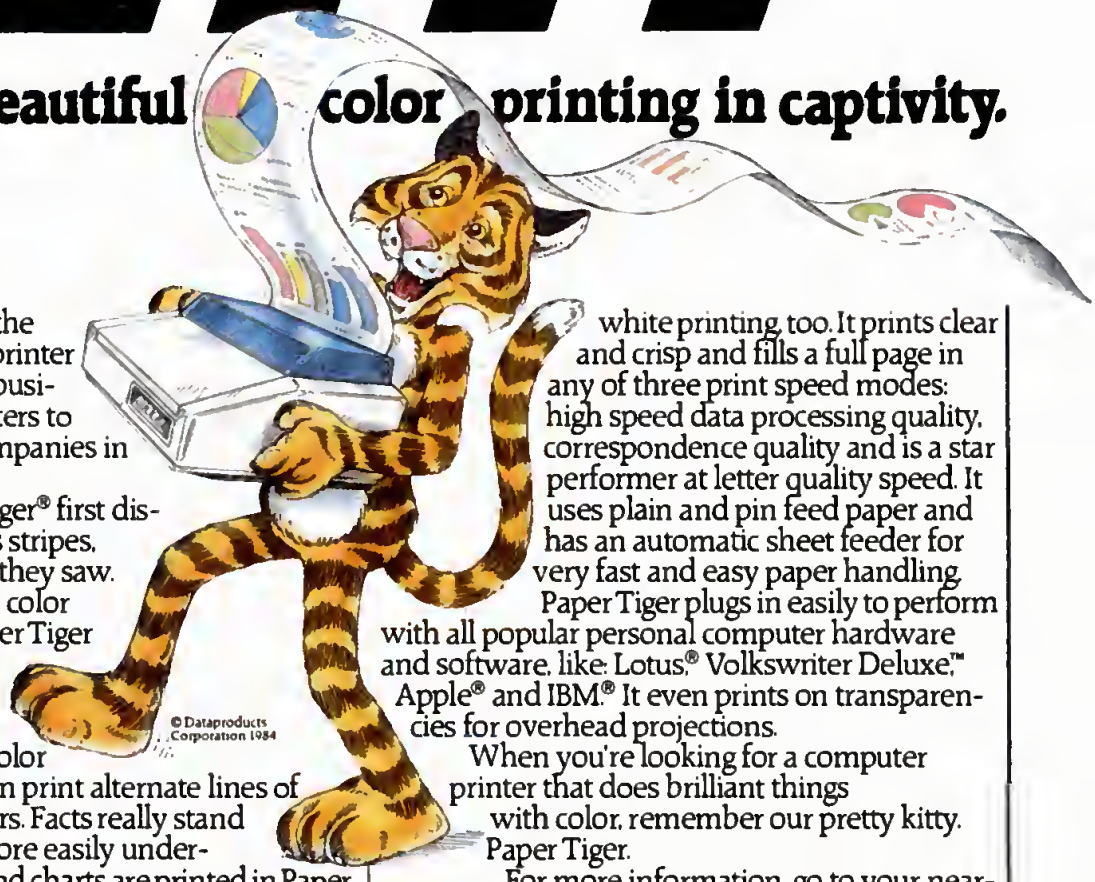

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transactions at any time during the year. Because the current Management Accounting files must be closed at the end of each period (historical files are not maintained), you must create archive files so that detail is not lost. This could be cumbersome if prior period adjustments must be posted to a number of archived files in order to produce revised management accounting reports. We're told that Attaché will be improving this feature in an enhancement to the *General Ledger* program that's expected this fall.

Accounts Payable

The Attaché *Accounts Payable* system provides you with the ability to maintain vendor information, enter invoices, print checks, and control cash flow—just what an accounts payable system should do. The system recognizes a single financial account to be stipulated for your bank account, against which all payments will be credited via the interface to the *General Ledger* program.

Each vendor must be assigned an alphanumeric ID of up to six characters as a primary key. An alternate key (up to four alphanumeric characters) can permit sorting by last name, area code, suburb, or any other field. Vendor inquiry is simplified by the use of a special "generic" inquiry facility on either the vendor number or the alternate key. To illustrate, if you wanted to scan the vendor list for names beginning with the letters *Smi*, you'd simply have to type SMI? and the system will present you with a list on your screen or printer.

In its current form, the *Accounts Payable* module requires you to set up a vendor record for each payment that you process through the system. Attaché has said that a late fall enhancement will provide a facility for processing payments to one-time vendors more easily.

The system handles all the normal types of transactions, such as invoices, credit memos, journal entries, and check writing. You can create automatic vouchers to generate periodically recurring payments such as rent, lease payments, and so on. When invoices are entered, the debit side of the entry can be distributed to as many as 14 accounts. (Automatic vouchers are limited to six ledger account distributions.) This could be a drawback if you have a large number of departments or employee expense accounts. At period end, all these account distributions can be accumulated by account, and a summary entry will be automatically posted to the general ledger.

Check printing is limited to a single fixed format, with sample forms being supplied with the *Accounts Payable* module. Payment selection may be manual or automatic. You can pay multiple invoices with one check or you can be selective about the invoices that you pay. The automatic selection procedure can be used to mark a full range of invoices for payment, and then within that range, a few invoices can be manually excluded.

The *Accounts Payable* module can generate five kinds of reports: a vendor master listing, aged trial balance, cash requirements report, purchase journal, and a payments journal.

```
GENERAL LEDGER - OPTIONS AND PARAMETERS          VER 2.0        05/08/84


1. ACCOUNT FORMAT                              2. FILE CONTROL
   LENGTH OF DIVISION (0-8)     1                 DISK DRIVE FOR MASTER C
   LENGTH OF ACCOUNT (0-8)      7                 DISK DRIVE FOR TRANS  C
   LENGTH OF SUB-ACCOUNT (0-8)  0

   MANAGEMENT ACCOUNTING REQUIRED? (Y/N) Y

   NUMBER OF PERIODS (1/2/3/4/6/12/13)    12
   CURRENT PERIOD                          2

3. PERIOD HEADINGS
   PERIOD 01 Jan            PERIOD 08  Aug
   PERIOD 02 Feb            PERIOD 09  Sep
   PERIOD 03 Mar            PERIOD 10  Oct
   PERIOD 04 Apr            PERIOD 11  Nov
   PERIOD 05 May            PERIOD 12  Dec
   PERIOD 06 Jun
   PERIOD 07 Jul

   Is the above information correct? (Y/N) Y
```

Figure 1: *Attaché's General Ledger parameters screen.*

1. *The accounts can be formatted into three segments. Any time you key in an account number, you need only type in the characters; the program automatically separates it into its segments, separated by periods.*

2. *File control is particularly important when working with floppies, but the system performs much better when put on a hard disk.*

3. *The system allows for accounting periods ranging from one annual period to thirteen periods of 4 weeks each.*

Business Pack I

Attaché's *Business Pack I* contains the *Invoicing/Sales Analysis, Accounts Receivable,* and *Inventory Control* software. These three modules are simple and straightforward. If you purchase Attaché's *Business Pack I,* you will find that it's relatively easy to set up and use. Although this is good news, unfortunately this sim-

```
                                  LTH Enterprises

MAY 10, 1984                  CHART OF ACCOUNTS LIST                  VER 2.0      PAGE  1

                                TYP  0                                          0  0
ACCOUNT   NAME                  REP.  --- /   ADD-TO ACCOUNTS   PERCENTAGE ACCOUNTS  REPORT FORMAT  0  0
CODE                            TYPE  T  C     1        2        1        2      C I U O N   T  P ACCOUNT
-------------------------------------------------------------------------------------------------------
1.1000    BALANCE SHEET         BS    S                                          0 0 0 0
1.1010    ASSETS                BS    S                                          0 0 0 0
1.1015    ------                BS    S                                          0 0 0 1
1.1020    CURRENT ASSETS        BS    S                                          0 0 0 0
1.1105    Accounts receivable   BS    1   0 1.1200                               2 3 0 0 0   N  1
1.1110    Inventory             BS    1   0 1.1200                               3 3 0 0 0   N  1
1.1120    Prepayments           BS    1   0 1.1200                               3 3 0 0 0   N  1
1.1130    Cash in bank          BS    3   0 1.1200                               2 3 0 0 0   N  1 1.2030
1.1200    TOTAL CURRENT ASSETS  BS    4   0 1.1500                    1.3200     3 0 1 5 0   N  0
1.1300    FIXED ASSETS          BS    S                                          0 0 1 0
1.1310    Land and buildings    BS    1   0 1.1400                               1 3 0 0 0   N  1
1.1320    Office equipment      BS    1   0 1.1400                               1 3 0 0 0   N  1
1.1330    Furniture and fixtures BS   1   0 1.1400                               1 3 0 0 0   N  1
1.1340    Motor vehicles        BS    1   0 1.1400                               1 3 0 0 0   N  1
1.1400    TOTAL FIXED ASSETS    BS    4   0 1.1420          1.3200               2 0 1 0 0   N  0
1.1410    Less accumulated depreciation BS 1  C 1.1420      1.3200               2 3 0 0 0   N  1
1.1420    NET FIXED ASSETS      BS    4   0 1.1500          1.3200               3 0 1 0 1   N  0
1.1470    OTHER ASSETS          BS    S                                          0 0 0 0
1.1480                          BS    1   0                                      1 0 0 0 0   N  0
1.1481    Investments           BS    1   0 1.1490                               2 3 0 0 0   N  1
1.1482    Goodwill              BS    1   0 1.1486                               2 3 0 0 0   N  1
1.1490    TOTAL OTHER ASSETS    BS    4   0 1.1500                               3 0 1 0 0   N  0
1.1500    TOTAL ASSETS          BS    0   0                    1.3200            3 0 3 0 1   N  0
1.2000    LIABILITIES AND CAPITAL BS  S                                          0 0 9 0
1.2001    ----------------------- BS  S                                          0 0 0 0
1.2010    CURRENT LIABILITIES   BS    S                                          0 0 3 0
1.2020    Accounts payable      BS    2   C 1.3106                               1 3 0 0 0   N  1
1.2030    Bank overdraft        BS    3   C 1.3100                               1 3 0 0 0   N  1 1.1120
1.2040    Accrued expense       BS    1   C 1.3106                               1 3 0 0 0   N  1
```

Figure 2: *The Chart of Accounts and Report Format master files are rolled into one.*

```
ACCOUNTS RECEIVABLE - CUSTOMER INQUIRY          VER 2.2      05/09/84

CUSTOMER NUMBER SURFUT        ALTERNATE KEY

SURFUTURE INVESTMENT CO.        TYP DOC.NO.    DATE REF.NO        AMOUNT
418 RADON STREET                INV    184 07/15/83 345-75556     118.18
WILMINGTON   DE                 CSH      1 05/09/84  184           4.00-
ZIP CODE   91983                                    TOTAL         114.18
ALTERNATE KEY WILM              INV    216 08/15/83 4543-978       98.98
PHONE NUMBER  (435) 723-7366    CSH      1 05/09/84  216          16.00-
1. CREDIT LIMIT       0                                TOTAL         82.98
DISCOUNT'%    0.00              INV    318 09/15/83 2323-545       78.82
SALES TAX     8                 CSH      1 05/09/84  318           7.00-
A/C TYPE      OPEN                                     TOTAL         71.82
TRANSFER TO                     INV    319 09/15/83 2323-545       75.57
STATE         DE                                       TOTAL         75.57
2. TERRITORY  10                INV    320 09/15/83 2323-545       61.61
TYPE          01                                       TOTAL         61.61
3. PRICE CODE 1                 INV    522 10/15/83 F60F5576      120.23
                                                         TOTAL      120.23
                                INV    523 10/15/83 F60F5576      145.82
                                                         TOTAL      145.82

Next page of transactions? (-/N) Y
```

Figure 3: *A Customer Inquiry screen from the* Accounts Receivable *module.*

1. *A credit limit may be established for each customer. During invoicing, if this limit is exceeded, the operator will be alerted to override the limit or cancel the sale.*

2. *Each customer can be assigned a territory code.*

3. *Each inventory item may be assigned up to three prices. In turn, each customer can be assigned a given price level to use as a default during invoice processing.*

plicity comes at some expense. The three modules in this set of software are less sophisticated and have fewer features than similar offerings with comparable prices. This is not to say that these systems will not satisfy the requirements of many small businesses, but it's important to have a clear understanding of what this software can and cannot do for your business.

The greatest shortcoming of the "preliminary" *Invoicing*, *Accounts Receivable*, and *Inventory Control* modules we reviewed was the lack of an automatic interface with the *General Ledger* module. Frankly, not having to deal with the financial accounting linkages makes it easier to understand and set up the individual modules. But this benefit is short-lived, because ultimately you will have to "book" the transactions you process with the *Business Pack I* software. As noted above, however, Attaché is developing software to allow you to automatically interface these systems with the *General Ledger*.

Invoicing/Sales Analysis

The invoicing capability automates your customer billing procedures and also provides a credit memo processing capability. To process an invoice, you simply enter the invoice "header" information, followed by information about the items sold (item number, quantity, price, discount, and tax status). The system can be closely integrated with the *Accounts Receivable* and *Inventory Control* modules so that most of the information required during invoicing is retrieved automatically from your customer and inventory files. Invoice, statement, and credit memo printing formats are fixed; special computer form samples are enclosed with the Attaché software.

The sales analysis system consists of a single sales report that can be sorted and summarized in a multitude of ways. Sales invoice detail can be listed, or the information can be summarized. Quantities, dollar amounts, costs, margins, and gross-profit percentages are listed for the current

period and year-to-date. Average selling prices and average costs are also reported for each product item. Moreover, you can request subtotals for each customer, inventory item, item group, or for any of the three user-established sales codes that can be assigned by the *Accounts Receivable* system.

Accounts Receivable

The Attaché *Accounts Receivable* module can help you keep track of your customer or client receivables on a "balance forward" basis (that is, by maintaining an aggregate balance due for each customer) or an "open-item" basis (maintaining balances due for each invoice). This determination can be made for each customer, and you can change methods at any time. This system can be used most effectively when integrated with the Attaché *Invoicing/ Sales Analysis* and *Inventory Control* modules.

A master record for each customer can be established for processing invoices, credit memos, cash receipts, and miscellaneous account adjustments. As in the *Accounts Payable* module, each customer is identified by a six-character alphanumeric code, and a four-character code can be established as the alternate key, allowing you to produce reports sorted by order of this alternate key.

Figure 3 shows a typical Customer Inquiry screen; Figure 4 shows the second screen, which details all the invoices rendered and cash received on an account.

The *Accounts Receivable* system has one unique option that could be quite useful if many of your customers are branches or divisions of a larger company. This feature allows the operator to set up both a head office account and subaccounts for the associated branch locations. Transactions may be entered against any of the branch subaccounts, and for accounting purposes they will be accumulated against the head office account. Invoices and credit memos entered against any branch will update the branch's sales details and update the aged balances of the head office's account, as will cash receipts and journal entries. The head office's customer statement will provide transaction detail from all branches. This could be particularly handy when you have to ship to many locations but prefer to bill and collect from only one.

```
ACCOUNTS RECEIVABLE - CUSTOMER INQUIRY          VER 2.2      05/09/84

CUSTOMER NUMBER SURFUT        ALTERNATE KEY

SURFUTURE INVESTMENT CO.          DATE LAST INVOICE 10/83
418 RADON STREET                  AMOUNT LAST INV.       145.82
WILMINGTON   DE                   DATE LAST RECEIPT 05/84
ZIP CODE   91983                  AMOUNT LAST RECPT       27.00-
ALTERNATE KEY WILM
PHONE NUMBER  (435) 723-7366      SALES PTD      250     MARGIN   G.P.%
CREDIT LIMIT        0             COST  PTD      200         50   20.00
DISCOUNT %     0.00               SALES YTD      684
SALES TAX      8                  COST  YTD      504        180   26.32
A/C TYPE       OPEN
TRANSFER TO                       OPENING BALANCE          0.00
STATE          DE                 90 DAY                 114.18
TERRITORY      10                 60 DAY                  82.98
TYPE           01                 30 DAY                 209.00
PRICE CODE     1                  CURRENT                266.05

                                  TOTAL                  672.21

Display transactions? (Y/-) N
```

Figure 4: *The second screen in the customer inquiry mode shows the details of all the invoices rendered and cash received on that account.*

The system is quite flexible in allowing for sales tax recording and accounting. You can establish up to 999 different sales tax rates. For each rate, you can establish a 20-character description, the tax rate, and an upper limit to be placed on the tax applicable to any single purchase. In addition, you can determine how tax calculations should be rounded and specify whether taxes should be applied to miscellaneous charges (freight, insurance, and the like).

The *Accounts Receivable* system can also provide the user with a bank deposit slip for customer checks entered in payment of accounts.

You can establish up to three two-character sales codes for each customer. These sales codes are used to categorize customers for sales analysis and report selection. This is a nice facility, as it allows you to segregate and report your sales as a function of a specific territory, state, sales representative, sale type, and the like.

Inventory Control

The Attaché *Inventory Control* system provides a simple means of tracking inventory units on a perpetual basis. Separate procedures for physical inventory are provided for as well. One of three inventory costing options can be used. With "Average" costing, the value of new items received is averaged into the cost of existing items to produce a new moving average price. With "Fixed" costing, the cost of inventory must be modified manually (as an adjustment). When items are received, the difference between the price paid for an item and this fixed cost is reported as a "buying" variance. Finally, with "Last" costing, the cost of an item is a function of the last inventory receipt of that item, and, as above, the revaluation of existing inventory is accounted for as a

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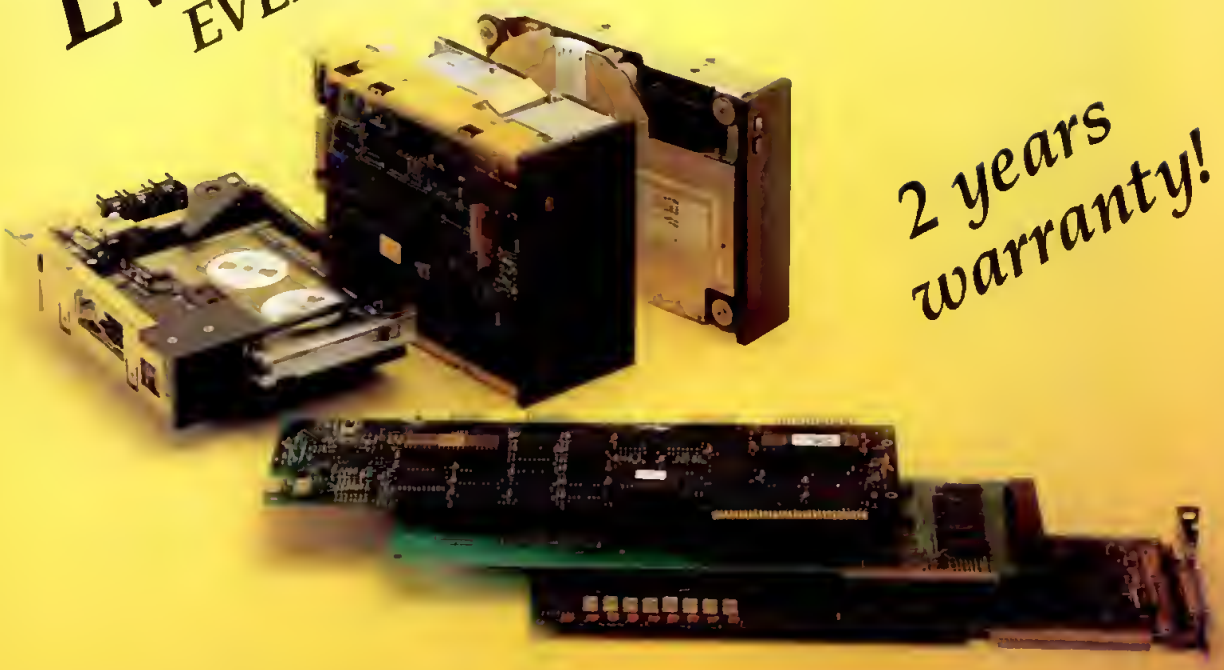

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"buying" variance.

For reporting purposes, gross profit from the sale of an item can be expressed as a percentage of either sales or cost.

The inventory maintenance functions can be used to add, modify, or delete inventory items. Printing an audit trail is optional. (Frankly, we'd prefer it to be done automatically.) As with most of the other Attaché system reports, you can choose to defer the printing of the report. (It's spooled to a disk file for printing at a later time.)

Inventory item codes of up to 10 alphanumeric characters serve to identify each item. The description field can be up to 20 characters in length. The item inquiry function provides a very nice feature that allows you to type "?" as the item number—the system will display a list of the items on file. (This feature is provided for some of the other functions as well.) This is a real help if you forget an item number and you don't have many items to keep track of. Further, if you are systematic in creating your inventory item IDs—such as widget1, widget2, and so on—you can mask your item inquiries by keying in, for example, "wi" to obtain a listing of all your widgets.

You can also specify a two-character item-group code and an eight-character bin location. The group code also allows you to classify and segregate your inventory items for reporting purposes.

The entry of inventory transactions is very straightforward. You can enter issues, receipts, returns, or adjustments. However, in most cases, issues would be posted automatically as a result of the invoicing process. An audit trail listing of these transactions is provided automatically by the software.

The physical inventory functions allow you to create a special physical inventory data disk, print physical inventory worksheets, enter physical counts, print a physical inventory variance report, and automatically update inventory files with the physical inventory quantities.

You'll find a curious, if not worrisome, option on some of the Attaché *Business Pack I* and *II* menus: "Check the Integrity of Data Files." The first thing we asked ourselves was: Why would we ever want to do this? Worse, why would we ever *have* to do this? Well, apparently the disk file access methods employed by Attaché utilize a set of pointers resident in the PC's memory to organize and access certain data files. If the system is abnormally terminated, this information can be lost and must be reconstructed. This is not a major shortcoming, but you'll have to keep this in mind as you use the software. If your local electric utility does "pull the plug" on you, you'll have a means of recovering the data. The section of the documentation entitled "Read Me First" has a useful section on developing a data backup rotation policy.

> The Attaché Inventory Control system provides a simple means of tracking inventory units on a perpetual basis and separate procedures for physical inventory.

Updates on the Way

At COMDEX in May, Attaché announced an update to the *Business Pack* accounting packages that they call *Passport*, available to Attaché customers at no charge. It will contain two major enhancements. One major feature of *Passport* will provide interfaces (both import and export) to a number of popular productivity software packages including Lotus' *1-2-3*, *dBASE II*, and *WordStar*. The second major facility of *Passport* is a general-purpose report writer that will enable you to prepare customized reports for any of the applications. A *Payroll* package is under development and is expected to be available soon. Attaché is also developing other system-wide enhancements, including most notably on-line help and tutorials, passwording, and support for multiuser/multitasking environments. The company expects to release these enhancements in the fall.

Documentation

The documentation is designed in flip-chart style, with the cover forming an easel of sorts. The system is so simple that you probably won't need the documentation for long. You can use the attaché cases for your own purposes while giving Attaché Software a little free publicity (the company name is embossed on the side of the case).

When presenting the main menu, the system continually reminds you of the percentage of disk space remaining. If the remaining space is within about a 10 percent threshold, you get an annoying but effective beep and message on each screen to remind you to perform the necessary disk file housekeeping and backup procedures. And, speaking of the organizing of disk files, we were somewhat disappointed to discover that the software must be loaded into the root directory of your hard disk (that is, you cannot use the software in a DOS 2.x subdirectory). We assume that Attaché will be addressing this in a forthcoming release.

While these systems are simple and have fewer features than some comparable accounting packages on the market, they should satisfy the needs of many small businesses, particularly if their simplicity results in savings on training time and expense. What Attaché's initial offerings for the U.S. market lack in sophistication, the company is attempting to compensate for with an aggressive post-sale support program. **—G. William Dauphinais and Mike Yesko**

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"The menu, Please?"

Menus list all your options and tell you exactly which keys to press for every *Please* feature.

That's to be expected. As the telecomputing leader, Hayes built its reputation on quality design, reliability and customer support. Now these same standards have been applied to a new data management system that is going to instantly change the way you do business!

Say you're looking for an efficient way to maintain sales data. *Please* leads you every step of the way in creating a sales database that might include names, addresses, dates and figures. These categories are called "fields" in database lingo, and they're the very heart of your database structure.

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Need a report fast? You and *Please* can put together a Quick List in a matter of seconds.

Want last month's total in a particular region? Press a few keys and it's yours! A few more keystrokes and you'll know who's moving product, and what's your biggest seller.

Please will supply you with labels for a mailing to selected customers. It can send customer information to your word processor for a promotional letter. And it can receive data from your spreadsheet program. *Please* will even look up a name and company for you, your Hayes Smartmodem* will dial the phone number, and you're ready to talk!

Taking this same sales database, you might also want to define special fields for a custom Output Plan. With a defined field for "COMMISSIONS DUE," *Please* can automatically compute each salesman's commissions, and print them out in a report of your own design. All this and more, just for saying "Please."

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You have the same flexibility with any database you and *Please* design. You can store up to 16 million records and 200 custom Output Plans for each database! More than you're likely ever to require. But isn't it nice

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Please."

"Put it here, Please."
Design a special screen format to position data in a particular place.

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Now you might think that a data management system that does all this must be difficult to use. Right? Rest assured. *Please* works hard so you don't have to. An easy-to-follow sample disk shows you everything you need to know to create your first database. Three *Please* menus show you which keys to press to access every feature. And whenever you need it, *Please* provides on-screen HELP messages, tailored to a specific task. So you needn't waste time reading through a list of unrelated instructions on your screen. Or stop what you're doing to consult a manual. In no time at all, and with no assistance at all, you'll be a *Please* database pro!

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CIRCLE 166 ON READER SERVICE CARD

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Stew Leonard, Jr., in his office with his PCs and chicken.

MILK, BUTTER, CHEESE, AND PCs

Stew Leonard's World's Largest Dairy Store is known for its Disneyland-style marketing. But as at Disneyland, behind the store's hype are some technical marvels—nine PCs.

Photographs: Terry Hourigan

A marquee - size computerized sign heralds the approach to Stew Leonard's "World's Largest Dairy Store" in Norwalk, Connecticut. Next to the sign is a petting zoo. Roaming the 500-car parking lot and handing out candy to children is a 6-foot cow! (It's really a 6-foot man in a cow outfit.) A realistic plastic cow guards the entrance, ushering you into the one wide—and crowded—aisle that winds its way through the entire store. You first pass the bakery, then the milk packing plant, where milk is packaged before your eyes. A woman in a cowgirl outfit hands out pizza samples. In the produce and meat departments, you can view workers portioning, weighing, and wrapping products. Stew Leonard has said that Walt Disney was the greatest marketing genius ever. Disney's influence is apparent throughout the store.

Stew Leonard, originally a milk deliveryman, opened the dairy store in 1969 and he has expanded his building 22 times to its current 100,000 square feet. It remains a family-owned, single-store operation. Over 100,000 people visit each week, purchasing 1,000,000 cartons of yogurt, 10 tons of cottage cheese, and more than 36,000 pounds of butter each year. The *New York Times* has called Stew Leonard's "one of the most remarkable success stories in American food retailing."

Enter the PC

Although the supermarket industry is just beginning to explore the use of PCs, it should come as no surprise to anyone familiar with Stew Leonard's that the store was one of the first to buy them. "Stew Leonard is a progressive thinker and very innovative," says Jeff Pirhalla, the store's data processing manager. Leonard's was the first supermarket in the state of Connecticut to install a scanning system back in 1976. Before the year is out, the store will be able to boast a network linking the store's 30 cash registers to a mainframe and to several PCs.

"We've found that if we spend money on new things, they pay for themselves," says Stew Leonard, Jr., vice-president of the company. It was Leonard, Jr., 29, a recent graduate of the University of California (Los Angeles) MBA program, who persuaded his father to try out PCs about 2 years ago, and he is responsible for their operation.

"After I graduated and came back here to work, I said to my father, 'I'd really like to get a personal computer.' He said, 'Look, I don't know anything about it, but all you gotta do is tell me you'll use it and that it'll pay for itself and you can go ahead and buy it.' "

Leonard purchased one PC with a monochrome monitor and a NEC printer in 1982. Now the company has nine additional PCs plus a Compaq portable and a graph plotter. He chose the IBM PC because he was already familiar with the quality of IBM typewriters and because he figured that if it didn't work out he could get a higher resale value on an IBM than on most other machines. He experimented with the *VisiCalc* and *SuperCalc* software packages before finally settling on Lotus' *1-2-3*, which, he decided, was the most comprehensive and versatile. He uses *WordStar* for word processing.

To learn how to use a PC, Leonard, Jr., worked with *1-2-3* to figure out the best way to remortgage a $5 million loan. He spoke with three banks, each offering different terms for the loan. The original bank charged a prepayment penalty and required a lump-sum payment for the remainder of the loan. One of the new banks would charge a lower interest rate, but a few percentage points as a fee up front. Leonard loaded all the information into the PC, figured out the net present values of the payments on all the loans, and decided which bank gave the best deal.

Now Leonard uses the store's PCs for

A realistic plastic cow guards the entrance, ushering you into the one wide—and crowded—aisle that winds its way through the entire store.

corporate planning, budgeting, and forecasting. One of the first things he did along these lines was to enter the weekly and daily sales figures for a 3-year period into the *1-2-3* spreadsheet. Currently, Leonard manually plugs in sales and customer count figures taken from hard copy that is generated by the company's minicomputer.

Tracking Sales

Using *1-2-3*, Leonard can compare sales figures for any week with those of the same week the previous year. His sales goal this year is a 20 percent increase over 1983 sales—which he claims the PC is helping him meet. One column of the spreadsheet lists the projected sales for 1984 based on the 20 percent increase. Once daily sales figures come in, the PC calculates the actual percentage change from last year. If sales are down, management asks whether the decline was caused by a holiday, or whether another store ran a big special. If sales have increased, perhaps an ad or special was particularly effective.

Graphs of 5-week moving sales averages allow Leonard, Jr., to visualize the store's sales. Asterisks indicate specials or ads. Through these *1-2-3* graphs, Leonard has verified that peak sales usually occur when the store runs a special. As a result, says Leonard, the store has quadrupled its advertising budget and now runs truckload specials at cost. The store advertises the truckload specials on the huge computerized sign out front. Says Leonard, "It's fantastic, unbelievable. A supplier came in the other day and said, 'Please don't put my cantaloupes on that road sign; we won't have enough.' We change that sign and, boom! The products move right out of the cases."

In addition to charting sales for the entire store, the PC breaks out sales totals for each of the store's seven departments—grocery, dairy, ice cream, meat, deli, produce, and bakery. The breakouts help department managers plan their sales strategies and clue in Leonard on depart-

Pastry Process Control

In Beth Leonard's in-store bakery, a PC helps her determine how much to produce every day.

Beth's Bakery sells more than a million freshly baked chocolate chip cookies per month—20 times more than any other in-store bakery, according to the Food Marketing Institute. A PC keeps the operation running smoothly.

The PC sits in the far corner of Beth Leonard's (another of Stew Leonard's children) office, silently supervising. Leonard uses the PC to plan production and track sales. The information from one calculation feeds the other. The PC creates graphs of 4-week average sales figures that help Leonard determine what baked goods and how many to prepare on any day of the week based on sales of the same day in previous weeks. Preparing just the right amount of each product, in turn, fuels sales.

The PC gives Leonard a printout of how long different steps in the production process should take and how many workers are needed to perform them. Since each batch of product is always the same size, Leonard doesn't use the PC to alter the proportions of ingredients. Instead, she varies the number of batches and thus the amount of time it takes to complete each step in the process. The PC's control of production allows the bakery to produce continuously, no matter what the expected sales, keeping goods right-out-of-the-oven fresh.

Using the PC has also helped Leonard determine the best way to run specials. The bakery used to run a "buy two, get one free" special on croissants. But by graphing sales, says Stew Leonard, Jr., the company saw that the special "put her sales through the roof. There was a huge jump in volume, then sales dropped below normal. People were buying a lot of croissants on sale and freezing them." Now, Beth Leonard just takes 20 cents off the price of croissants. This strategy spreads sales out more evenly. —C.G.

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Diablo

Reason 1: Diablo Leads The Industry
Diablo is a clear leader in the printer industry, the one brand all others compare to. Why go with any less than the original?

Reason 2: Clearly Superior Quality
Ask our customers. Datamation magazine does, in the most respected annual brand preference survey. And year after year their survey has shown Diablo daisywheel printers voted number one—by end users and OEM's alike.

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Our universal interface for personal computers means that any of Diablo's API printers plays with every major brand of personal computer. Including IBM's.

Reason 17: Reliability
Compare Diablo printers to the competition. Our printers run longer between servicing than the others, model for model, across the board.

Reason 18: Over 1200 Diablo Dealers
Diablo printer products are available throughout the US and Canada at over 1200 locations.

Reason 19: Genuine Diablo Supplies and Accessories
Diablo doesn't even stop there. We offer over 300 printwheels,

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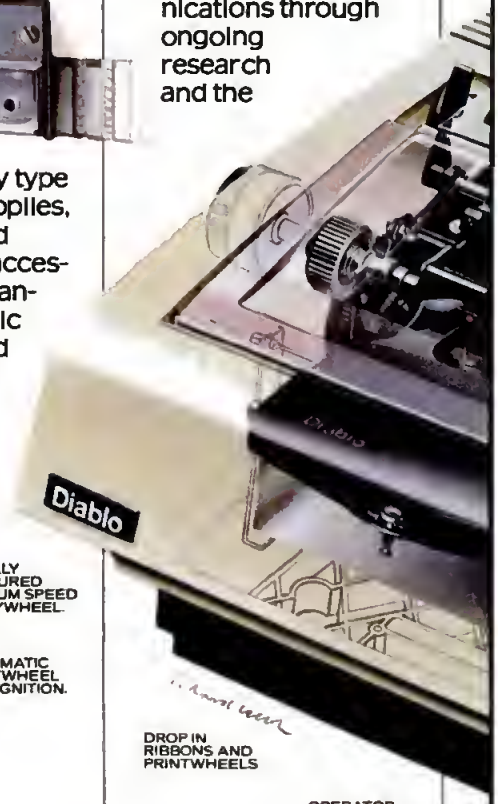
Reason 20: Xerox, Our Parent
Diablo Systems Inc. is a part of Xerox Corporation. Together we represent an American institution dedicated to improving communications through ongoing research and the



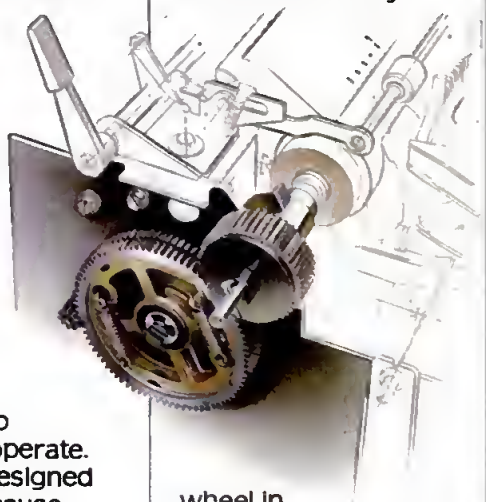
creative application of technology to everyday business life worldwide. And we will continue this endeavor as long as there are discoveries to be made.

Reason 21: Service for All Diablo Products
The worldwide network of Xerox and Diablo service centers stands ready to provide fast and economical service. Couple this with the technical and service hotlines and you've got a complete support network.

Reason 22: Nothing But Printer Products
Diablo makes printer products and nothing else. We make no compromise between printers and other system products. Other printer companies do.

Reason 23: We Make Printers Easy
All of our printers are easy to set up and easy to operate. They were designed that way, because they're supposed to be used, not fussed over.

Reason 24: Tradition of Innovation
We're the leader in innovation. We always have been. Diablo invented the daisywheel in 1972 and we've never looked back. We're constantly refining our products and looking for new ways to improve the technology. That's why we're the only printer company that offers the variety of printers and technologies that we do. We simply don't believe in resting on laurels.



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IBM micros are here to stay. And so is Diablo. That's why we have developed such a complete line of IBM compatible printers. Whether daisywheel, matrix or color; correspondence or graphics, dedicated or API, Diablo's "IBM compatible" printers are just that.

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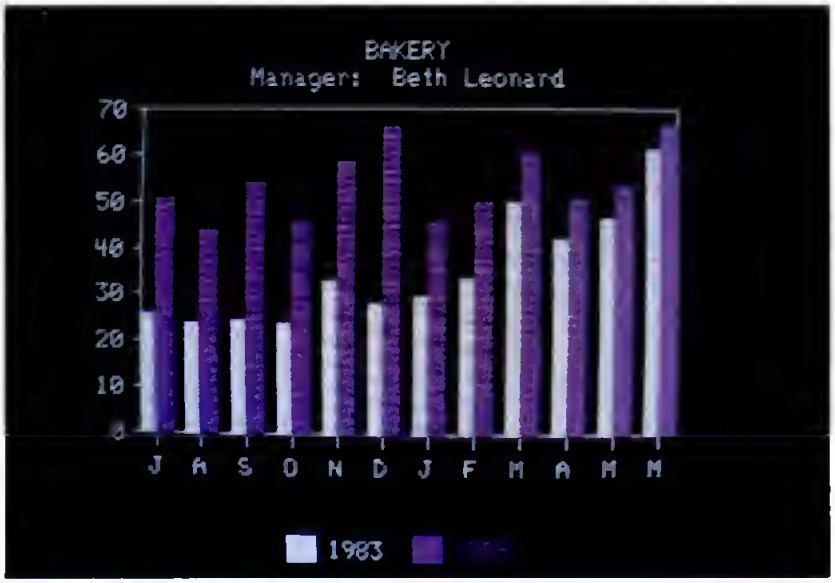

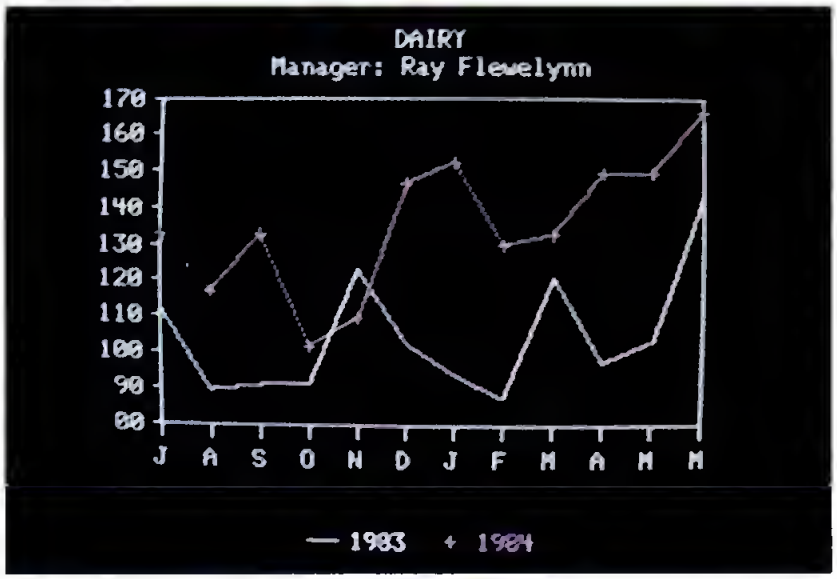

Above: Bar charts produced by Lotus' *1-2-3* show comparative hypothetical monthly sales between fiscal 1983 and 1984 in Beth Leonard's bakery. *Below:* Line graphs, also created with *1-2-3*, compare sales figures for fiscal 1983 and 1984 in the dairy department. Asterisks at peaks in the graphs indicate specials, revealing that specials do indeed increase sales. In addition, the graph indicates that sales peaks generally occur around the same time each year.

ments needing closer attention. For example, week-by-week comparisons between 1983 and 1984 sales figures indicated below average sales increases in the dairy department. The company's cost accountant graphed moving averages of all the sales records with the PC, looking for trends. As a result of these calculations, the company has changed orange juice and fruit drink suppliers.

The company now has 400 employees, about 100 more than in 1983, but graphs of wages and overtime reveal the same peaks and valleys for both years. According to the graph, wages and overtime dropped in April of both years, rose in May, and shot up in June, in sync with the pre-Fourth-of-July rush. The company is currently developing a program for the PCs that will chart hourly customer count to help schedule its workers.

Leonard, Jr., has set up a macro using *1-2-3* that runs a series of graphs—5-week moving averages, customer count, wages and overtime, and so on—for the entire store and for individual departments. He plans to videotape these "shows" for later use in corporate and departmental meetings.

Recently, the company began training department and production managers to use *1-2-3* for tracking sales in their own departments. "We'd like to have a PC in every department manager's office—even in the meat and deli departments," says Leonard.

At the corporate level, Leonard used the PC in March to project the yearly financial statement for the fiscal year ending the following May. By extrapolating the remaining months of the fiscal year from graphs for labor, costs, and so on, he made expense estimates for the rest of the year with which the other executives agreed. Once Leonard entered key variables, *1-2-3* set up all the balance sheet ratios: working capital, inventory turnover, payable days, debt to equity, long-term debt, return on investment equity, current ratio, debt to assets, and sources and applications of funds. Leonard says he

can get an entire financial statement from *1-2-3* and compare one year to another easily.

The Current Setup

"The problem right now," he says, "is that the PCs are standalones, just workstations. All the data has to be punched in, and it becomes a cumbersome job."

The store's computer setup has changed little since the scanning system was originally installed in 1976, although the company has subsequently doubled its computing capacity. Employees log deliveries and monthly physical inventory figures into two NCR 8250 minicomputers that automatically subtract sales from inventory. When the inventory level drops below a certain point, the minis produce a report reminding the buyer to re-order. The minicomputers also perform all the accounting functions for the store: general ledger, payroll, and accounts payable.

Everything that comes into the store, or that is packaged or produced within it, has a Universal Product Code (UPC). "We reject items that don't have the UPC," explains Leonard. As products sell, 25 cash registers within the store and 5 outside at the flower and ice cream stands collect sales information through the UPCs. Programmable keys on the registers also track items, such as dog food, that are too bulky to run over the bar-code reader, or ice cream cones that melt too quickly to carry a code.

The cash registers send UPC and cash flow information to two NCR 726s. One of these minicomputers runs the system and records all the information on a cassette tape. The other acts as a backup to the first and makes a duplicate copy of the information.

Through action codes on the NCR 726, the money room can obtain reports of gross intake, how much cash is in each machine at the beginning of the day, total cash, checks, food stamps, and vendor coupons in each drawer, the amount that has been picked up, and the amount of money left in each drawer after pickup. According to a money room worker, "We can tell immediately if a register is a penny over or a penny short. We can tell whether the money came in as cash or as a check. Before the system was installed we could only tell if the cashier was over or under."

Not only does the NCR 726 monitor the cash flow in each lane, it also keeps track of the cashiers. Each cashier is assigned an action code and logged in through the code at the beginning of each day and logged out at night. In this way, the store can follow the cashier from register to register, reducing the probability of employee theft.

The minicomputer loads checking in-

Above: The two NCR 9300 mini-mainframes will be the heart of the new computerized system. Sales information will come into the system through the scanners at the cash registers *(left)* and will then be channeled into two NCR 726s. The NCR 9300s will collect the data over the modem and use it to update the company's database.

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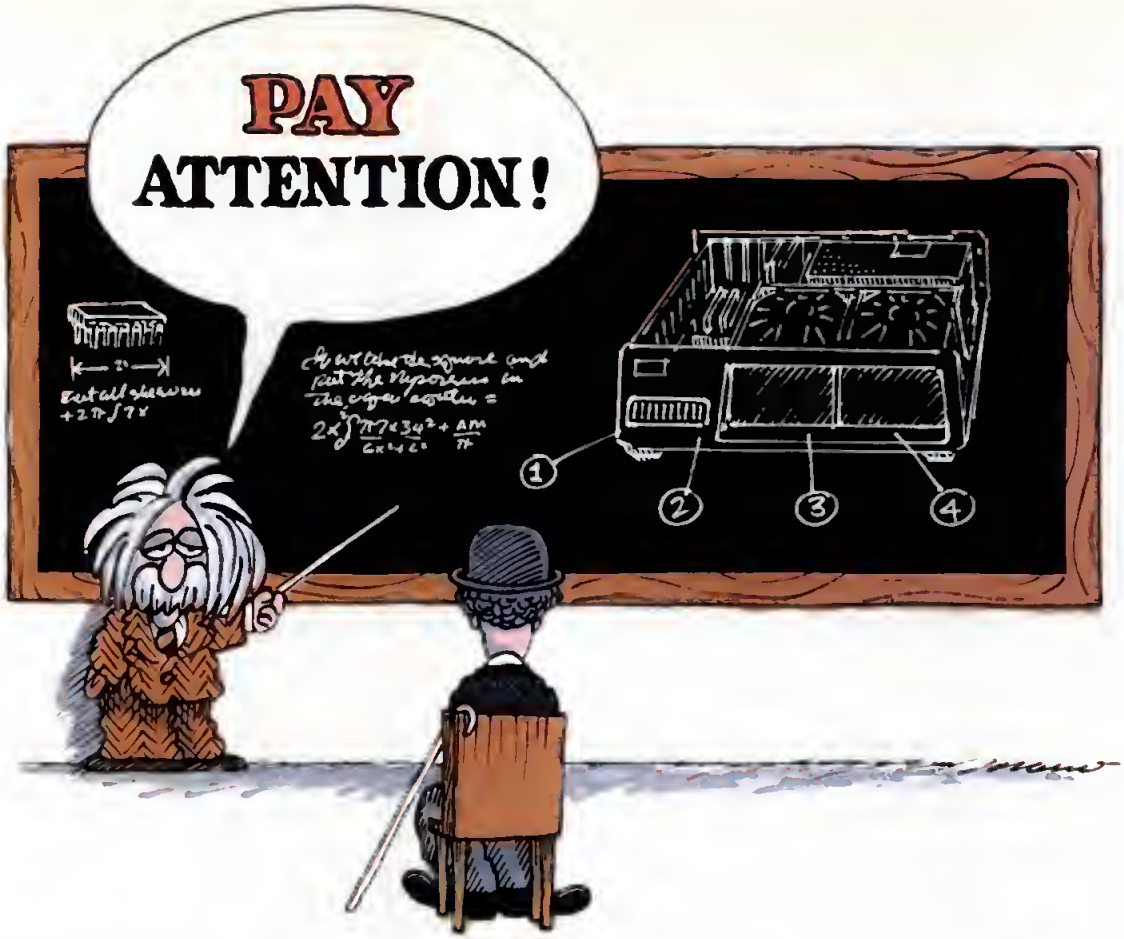

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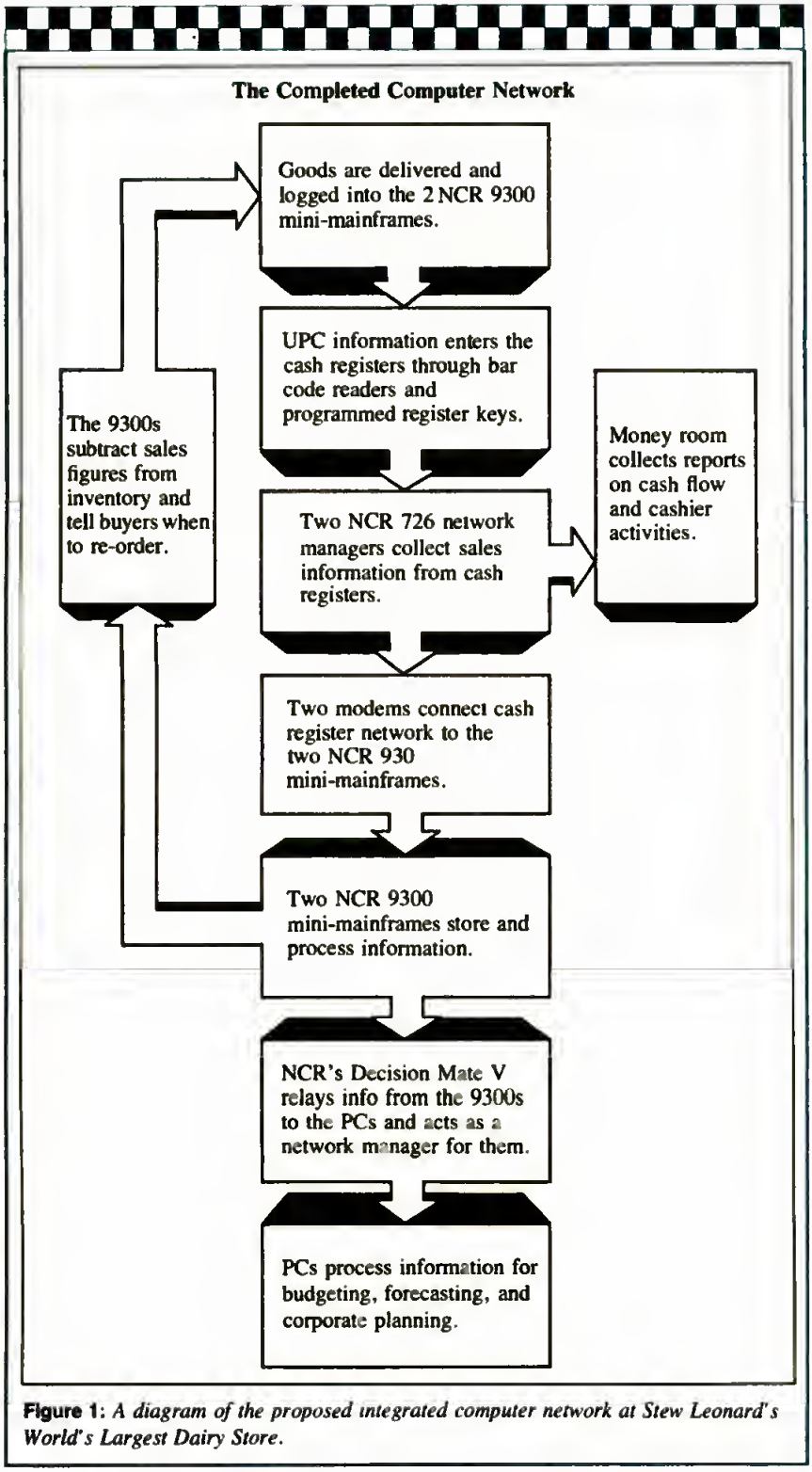

Figure 1: *A diagram of the proposed integrated computer network at Stew Leonard's World's Largest Dairy Store.*

formation on the store's 50,000 courtesy card holders into the 726, which assigns a lock-up status code number to customers who have passed too many bad checks. If one of these customers tries to pay by check, the cash register locks up and the cashier is unable to take the check. The company also uses the courtesy card information for advertising: it runs more advertisements in locales populated by larger percentages of card holders.

The 726 records the lump-sum sales total per day and provides a sales velocity breakdown for each hour the store is open. The store uses sales-velocity-per-hour information to help schedule the right

The company is currently developing a program for the PCs that will chart hourly customer count to help schedule its workers.

amount of help; in the future, the PCs will help with this task.

At the end of the day, cassettes are taken from the 726s and loaded into the 8250, which sorts UPC information by item and department, updating its database. The mini also prints figures, which are entered manually into the PCs, including the price of goods and quantity sold, cost to the store, "add-on" costs of putting the product on the shelves, and gross profits.

A New Network

An all-inclusive network (see Figure 1) is due for completion in a matter of months. The new network will perform all

the functions of the current system, but it will link up all the pieces. In addition, two NCR 9300s mini-mainframes will replace the 8250s, which will be relegated to store-energy management.

The 9300s will communicate by modem with the 726s. The 9300 will dial the 726 system downstairs; once the two systems exchange identification, the 726s will send the information over the line.

NCR's Decision Mate V, a microprocessor with a 10-megabyte Winchester hard disk, will act as network manager for the company's ten PCs and one Compaq, relaying figures—for sales, customer count, wholesale cost of the products, "add-on" costs of putting the product on the shelves, and gross profit—from the 9300 to all the PCs.

Leonard, Jr., estimates the payback period for the $300,000 system to be 4 or 5 years. The return will come from the store's increased ability to determine which products sell best in different seasons, enabling it to fine-tune its product selection. It's a maxim in the supermarket industry that 80 percent of the profits come from 20 percent of the products. Stew Leonard's aim is to sell the most profitable 20 percent. Thus while most supermarkets sell about 14,000 products, Stew Leonard's sells only 700 to 800. The new system will monitor check-cashing history more closely to cut back on losses from bad checks. In addition, the system will include electronic time clocks, eliminating paper time cards and cutting down on costly labor to process the cards.

Leonard, Jr., likes to plan far into the future. "We'd eventually like faster feedback and everything done as graphs," he says. Does he also dream of opening more Stew Leonard's dairy stores? He shrugs, and feigns hesitation. He admits that he would like to operate additional stores—and put computerized cash register terminals in them that would be connected by modem to the main store. "But," the son says, "my father's philosophy has been to put all your eggs in one basket and watch the basket." ■

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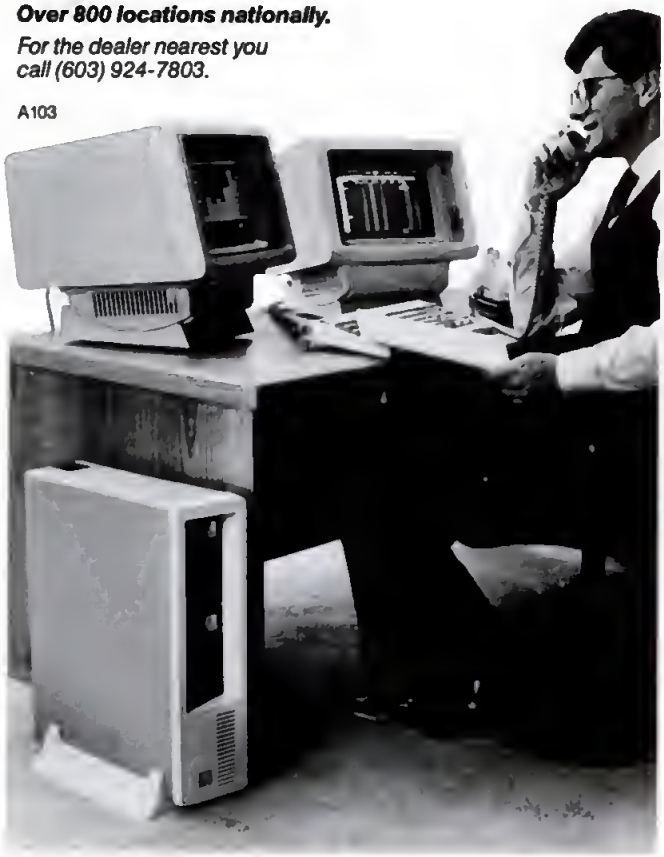

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CIRCLE 326 ON READER SERVICE CARD

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CIRCLE 198 ON READER SERVICE CARD

PROJECT: DATA BASE

Part 7

In this installment of our series reviewing databases for the PC, we cover the top-of-the-line programs—those in Category 4. They include, among others, the long-awaited dBASE III.

Ever since the June 12 issue of *PC Magazine* (Volume 3 Number 11) bearing the first installment of "Project: Database" appeared on the newsstands, we've been receiving letters and phone calls from corporations and consultants asking one question: What are the names of the Category 4 databases?

The quantity and urgency of the calls reflect the shift from mainframes to microcomputers for major corporate applications. The callers explained that their companies were preparing to invest a great deal of money and effort in designing and building an application to be used on the PC, and business pressures simply wouldn't allow them to wait until late summer to make a decision.

Here, finally, are those database packages for the IBM PC that we deemed to be in Category 4. These software packages had to meet all of the requirements of the preceding categories; that is, they had to possess the ability to handle two or more files simultaneously and a procedural language or other means for performing programming operations against the database. But the Category 4 packages also had to be outstanding, unique, or revolutionary in some other way. Most go beyond database processing and are better described as application generators. Each one provides enough database processing power to create full-fledged business applications. The nine products in this seventh installment of "Project: Database" are the cream of the database crop.

SAVVY PC wins the prize for uniqueness—it uses a pattern-recognition algorithm to assist the user in developing a personal language. *power-base* is special in that it gives the end user a great deal of almost effortless power via a menu-driven system. *SALVO* is a finely wrought example of a relational database management system that can be used by both nonprogrammers and advanced practitioners.

Revelation is unusual in that it runs under the PICK operating system (though it will also execute DOS commands). *DataFlex* is special in that it supports single- and multi-user systems as well as 8- and 16-bit machines. *PC/FOCUS* communicates readily with its mainframe cousin *FOCUS*.

informix, originally written in C for UNIX systems, was recently made available to run under DOS. *KnowledgeMan*'s query language is based on IBM's SQL, and the program has optional screen painting and graphics utilities.

Fittingly, the last review in this series is of *dBASE III*, the successor to *dBASE II*, the database software that started it all. The enhancements in *dBASE III* respond to the demands of microcomputer users for increasingly sophisticated database managers. Database buyers are looking for packages that, at all levels of power, will do more of the work for the user and allow greater flexibility in defining and processing the data at hand.

In such a high-demand, high-stakes market, nothing stays still for long. So in the next issue we will describe the enhancements, new versions, and the new database products that have appeared on the market since the initiation of the "Project: Database" series. But, for the moment at least, we can take a short rest, assured that we've seen all the database software, from Category 1 through Category 4, currently available for the IBM PC. **—Stephanie Stallings**

Photograph: Dennis Chalkin

PROJECT DATA BASE

SAVVY PC: A Programming Labor of Love

```
0.  Quit
1.  Enter new employees
2.  Move an employee to different dept
3.  Give an employee a raise
4.  List current data

3

Enter LAST NAME DiMeara
Enter FIRST NAME Stefano
Enter CURRENT SALARY 30000.00
Enter DATE OF CHANGE 10/18/82
```

After Option 3 is selected from a *SAVVY PC* user-defined menu, a series of four prompts appears.

SAVVY PC is fun! *SAVVY PC* is different! *SAVVY PC* is outrageously unstructured! What makes *SAVVY PC* so special? For one thing, *SAVVY PC* is the only product of Excalibur Technologies Corporation, a public corporation founded in 1980 and specializing in research on pattern recognition. The research for *SAVVY PC*, however, goes back 20 years. Excalibur gave *SAVVY PC* its own operating environment (including its own operating system, programming language, file manager, compiler, and linkage editor), automatic memory allocation, and a pattern processor based on Excalibur's Adaptive Pattern Recognition Processor. These functions are so completely integrated that it is difficult to determine which one makes *SAVVY PC* so unusual.

SAVVY PC
Excalibur Technologies Corp.
P.O. Box 26448
Albuquerque, NM 87125
(505) 242-3333
List Price: $395
Description: Relational
Requires: 64K RAM, 1 disk drive, *SAVVY PC*'s own operating system.
Records per File: 20,000

CIRCLE 765 ON READER SERVICE CARD

Pattern recognition is one unique *SAVVY PC* capability. Its pattern processor enables *SAVVY PC* to recognize any word—in English or any other language—that you have first defined to it. However, much more important than the pattern processor is *SAVVY PC*'s remarkable programming language. You will not fully appreciate *SAVVY PC* as an end user; you must get your hands dirty and write a program from scratch. As a programmer, you start with about 85 factory-supplied, fundamental programming elements. They include commands such as DISPLAY, DIVIDE, and GET; standard items such as INTEGER and FRACTIONS; standby tasks such as DIAGNOSTICS, ARCHIVE, and CONFIGURATOR, as well as many others.

With this relatively small but very versatile dictionary, you start building your own language—yes, your *own* language—by adding to it. You create natural language programs that emulate English. (The resulting database system that the end user sees can be in any language you like.) English sentences have nouns or names for things in addition to the verbs that make up the bulk of the *SAVVY PC*-supplied dictionary. The nouns are called *items* in *SAVVY PC*. An item is a container for information. For instance, you can use the verb INPUT in the phrase INPUT the LAST NAME. LAST NAME is not in the supplied dictionary, so *SAVVY PC* will tell you that it has never seen LAST NAME before and will ask you if you want LAST NAME as an item. If you say yes, *SAVVY PC* will add the item LAST NAME to its vocabulary and wait for you to enter information, say JONES, into the item LAST NAME. LAST NAME, as an item, can now be used in a multitude of ways. You can enter the command DISPLAY the LAST NAME, and *SAVVY PC* will show you JONES. Incidentally, if you accidentally key in DSILPAY the LSAT NMAE, what you see on the screen will be automatically corrected to show DISPLAY the LAST NAME. The pattern recognition feature permits this automatic correction. *SAVVY PC* does not ask you to rekey any misspelled words. You never know that it has corrected your input. In fact, if you make a typographical error, you may not even be aware of the error. When more than one item in the dictionary might be appropriate to correct an entry, *SAVVY PC* presents you with a list of these items from which to choose. For example, suppose you typed the command SHOW the LENGTH OF because you wanted to see the contents of the item LENGTH OF PROMPT. When you originally entered the item in the dictionary, you did so with a spelling error, but later reentered it properly. Since *SAVVY PC* retains both versions of the item, and because LENGTH OF SHOW is also an item in the dictionary, *SAVVY PC* responds as follows:

```
I'm not sure what LENGTH OF
refers to.
Is it one of these:
  1. LENGHT OF PROMPT
  2. LENGTH OF SHOW
  3. LENGTH OF PROMPT
  4. or None of the above?
Please type the number of the
correct answer:
```

If you choose 4, *SAVVY PC* asks you if you wish to establish LENGTH OF as a new item. You can toggle off this recognition feature. If you do, everything you type must be correct.

New items that you create can be combined to form new commands. You do this by creating a *SAVVY PC* task. You name the task, and the name is added to the vocabulary for you to use over and over again. Complex tasks can be built by combining your library of simple tasks. You can combine tasks in any way and as often as you like. You can build as many tasks as you have disk space for.

Functions allow you to build more sophisticated tasks. A function is an instruction or a sequence of instructions with blanks to be filled in later. The blanks are called *arguments* and are marked by a series of numbers in angle brackets like this: <1> and <2>. For instance, suppose you have created an input screen to prompt you for the fields in the records of your database, and you wish to define where the actual data entries are to be made.

You first define a function that allows you to specify the item to put information into and where this item is to appear on the screen (for example, the line and column coordinates). You normally put this item to the right of or underneath the prompt for the item on the input screen. Assume that you have completed writing the task that puts the item prompts up on the screen. Suppose that you named that task SHOW EMPLOYEE PROMPTS. Call your new function ENTER and define it with three arguments. The first argument allows you to enter the name of the item where you are going to put information. The second specifies which line of the screen the data entry for the item will begin on, and the third specifies the column on the screen where the data entry for the item will begin.

You can now use this function. If you key in ENTER, *SAVVY PC* will generate "the item <1>." You might respond with LAST NAME. *SAVVY PC* will respond with "on line <2>." You might respond with 5. *SAVVY PC* will respond with "at column <3>" and you might respond with 18. If you then incorporate this function in a task and execute the task, you will find your cursor on line 4, column 18, where you might key in JONES. If you displayed LAST NAME after keying in JONES, you would find that it contains JONES.

Now if you use this function (called ENTER) for each item that is to be entered and combine the functions with the task that displays the input screen prompts (which is called SHOW EMPLOYEE PROMPTS), you can create the complete input screen for your employee, JONES.

To fully appreciate SAVVY PC you must get your hands dirty and write a program from scratch.

You could use this new task by keying in its name, ENTER EMPLOYEE INFORMATION (or ENTER EMPLOYEE or EMPLOYEE INFO or a multitude of other variations that will also usually execute the task). *SAVVY PC* would present you with the input screen and put the cursor at line 5, column 18, where you would start entering information for JONES. You could now define a task that would allow you to view the information you have just entered for JONES on the screen. It would also be a combination of tasks and functions similar to the ENTER EMPLOYEE INFORMATION task. Then you would be able to enter information for JONES and, whenever you wish, view it again. But what about SMITH? If you enter information for SMITH instead of JONES, you will then lose the information on JONES, since you have defined a method of inputting and displaying information for only one person. If you wish to store information on many people, you must create a file, define a key, and provide the means for new records to be placed in the file. You might also want to write a routine that allows you to continuously add employees to the file until you are finished. You do all this by using a combination of commands, tasks, and functions.

Using *SAVVY PC*, you generally start from the very bottom, an element or item or field, and work up to a record and then a file, building in whatever nuances you desire as you go. This method is very different from that of the more traditional database managers such as *dBASE II*, which give you generalized tools that allow easy design of a file from the top down. They save you work, but they are also much more structured than *SAVVY PC*. In *SAVVY PC*, you don't have to create a file at all.

However, when we created the *PC* database system for the benchmark test, *SAVVY PC* did not require that we start from the bottom. In fact, we started by creating the files and telling *SAVVY PC* to create new items as we went along. We then built the tools that allowed us to enter data into the files and to index them.

Unlike more structured programs, *SAVVY PC* does not require you to specify field, record, or file lengths. *SAVVY PC* allows you any variable field size up to 255 characters as you input the field, and it fully controls and allocates the file space for your entries. The size of the actual data you enter is appended to the field in the

Illustrations: Phil Anderson

file. Anything can be entered unless you restrict the types of entries in your *SAVVY PC* tasks, in which case the fields begin to take on special characteristics.

In constructing the benchmark test, we built one query that accesses all three files and displays selected information from each of them. Finally, we incorporated all the tasks in a menu. We did not develop any provision to display the entered information on the screen or other functions that would be nice to have in a real-life environment.

SAVVY PC does not do everything in the generally accepted best way. For example, it has no SORT command. In order to sort the *PC Magazine* salary file, we created a task named SORT BY SALARY. This task creates an index file (SALARY SORT) that contains a key (SALARY ID), the employee number (EMPLOYEE #), and the last name and first name (EMPLOYEES INDEX) for each employee's most current salary record (ignoring old salary records). In the task that creates the index, we defined the key of the index file as CURRENT SALARY and EMPLOYEE ID (which is last name and first name) so that when we stored the employee number, last name, and first name in the index file, they were in order by salary, last name, and first name (SALARY ID). *SAVVY PC* will do this ordering automatically when it saves the file. Creating an index file for only the most current salary records rather than all of the salary records requires more processing than selecting all the salary records. We also created our report from this sorted file rather than by sorting the department file and spinning off the report from it. All three files are accessed for the report, which is produced in salary order.

Because of its pattern processor, *SAVVY PC* recognizes all the names you give to your tasks, functions, and items once you have defined them. You can also give your tasks and items names with more than one word. You could define tasks called BROWSE THROUGH THE FILE or PRINT NAME AND ADDRESS or CLASSIFY ZIP CODES. You can rename these tasks or associate them with another name, a synonym, and therefore tailor the language for particular applications. BROWSE THROUGH THE FILE could be BROWSE THRU THE EMPLOYEE FILE, for example. You can even make these synonyms in another language. A Spanish-speaking database system? No problem with *SAVVY PC*.

There is a trade-off, of course, for this kind of "tailorability." You work at a very low level, and you must do a lot more to develop a system than is required by a higher-level language. The user of the system, on the other hand, never has to see compiled code or even the plain-language *SAVVY PC* tasks. If you do a good job, the user will have a tailored menu for the basic functions he or she performs and access to the data by using a natural-sounding language (mistakes and all).

Because of its pattern processor, SAVVY PC recognizes all the names you give to your defined tasks, functions, and items.

Because such a free-form language might make the program slow, *SAVVY PC*'s designers included some machine optimization facilities to combat the problem. *SAVVY PC* watches you and tries to optimize your performance. For instance, if you start browsing through a file (using a *SAVVY PC* task), *SAVVY PC* may read 20 records into memory when you start the task. As you browse, you may change a record. *SAVVY PC* marks this record in memory. At some later point it will know to save that record, which it will do if it is the only one that was changed. This procedure reduces the need for disk access. The system also does its allocations (buffer, memory, disk storage) differently, depending on what *SAVVY PC* observes of you and your application.

SAVVY PC programming is a labor of love. What if you are not interested in a labor of love? Excalibur still wants you to use its system so it includes with *SAVVY PC* a complete name and address file application called *Contacts* that can be used to keep track of customers, club members, employees, and so on. The entire system is easy to use and demonstrates the sophistication of systems that can be developed with *SAVVY PC*. The system was written in *SAVVY PC*, of course, so you can modify it or add to it as you wish. The *Contacts* system is also available as a sampler for $24.95. We tested the sampler, which has a limited database of 20K and comes seeded with demo entries and sample reports. (The *Contacts* with *SAVVY PC* is not so limited.) For variety, a MONEY DUE file is also provided. The sampler features a fully developed database system and lets you fetch specific records; browse through records; search for a pattern of information; add, remove, and change information; design and run reports; or design a new database file. This last option will allow you to generate a complete file management system.

What else comes with the system? You get a PC manual (tutorial and reference guide) and a *Contacts* manual. You also get three disks (PC system and backup disks and *Contacts*). The documentation has some very frustrating inaccuracies, especially early in the tutorial. It does, however, contain some interesting stuff not generally found in program documentation, such as a general implementation plan for *SAVVY PC* programmers and database reference books. We expect to see other completed applications to become available over the years besides the *Contacts* database system.

All in all, for the right person and the right system, *SAVVY PC* is great.

—Barbara E. & John F. McMullen

power-base: A Heartbreaker

From a software reviewer's standpoint, *power-base* is a heartbreaker. It clearly has the potential to become a powerful force in the market, but that potential has not been realized in the product's first release.

The Good News

power-base (PB) is an integrated, menu-driven, relational database management system designed for the end user, as opposed to systems with procedural languages, which are really intended for use by applications designers and programmers.

Files are defined (or created) when you paint an input form on the PC's screen. *PB*'s screen-painting utility is excellent in every important respect—much easier to use than similar utilities found in even the most expensive procedural-language-based systems.

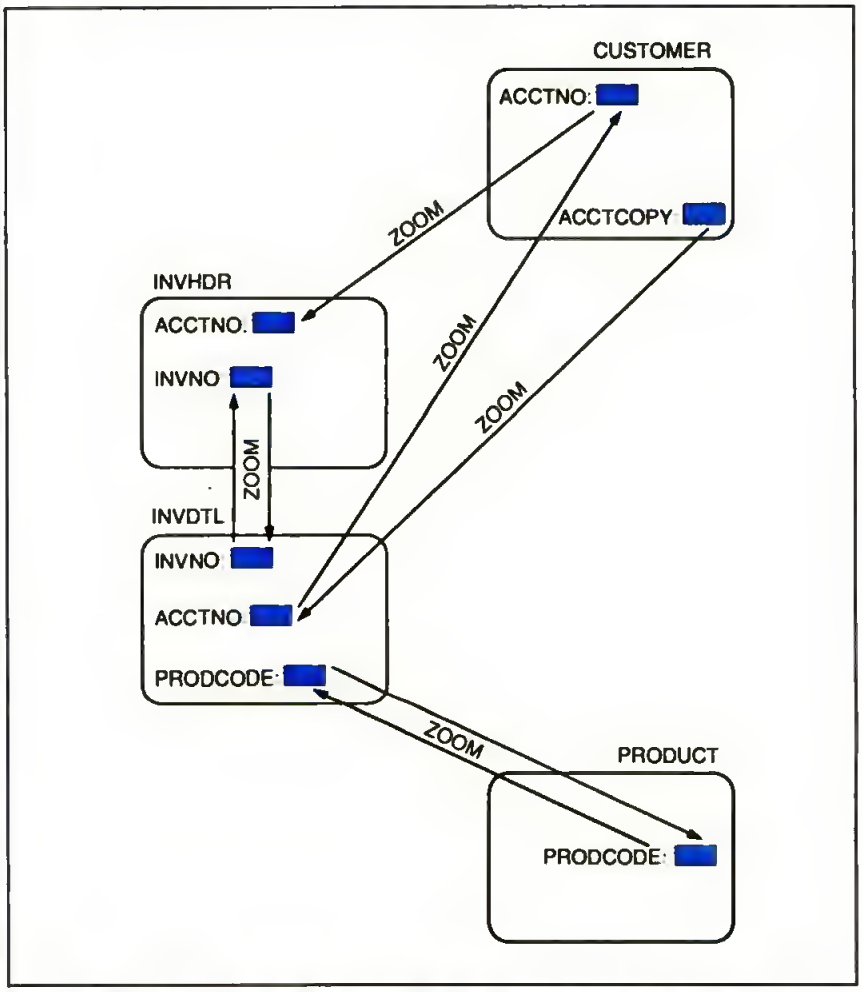
You simply type in screen prompts and then answer *PB*'s questions regarding the related variable. The screen can be rearranged at any time, and visual attributes (brightness, inverse video, and so forth) can be assigned either to prompts or input lines.

Fields are defined by type and size, and editing checks can be defined for each. Once the screen is defined and accepted by the user, *power-base* creates associated data and housekeeping files.

Any number of files can be created, ideally with master/unit (that is, parent/child) relationships. Finally, links can be established connecting fields in the various files to provide a path for the Datazoom feature.

To understand how the Datazoom feature works, picture, if you will, an invoice system with customer files, part-number files, and order-transaction files. Each customer is represented by a record in the customer file. Each line item in an order is represented by a record in the order-transaction file, and each part is described along with its price and inventory information in the part-number file. Assume further that each customer has an identifying number, each order-transaction record has a customer-number field, and each part has a part number that appears in both the order-transaction file and the part-number-file.

Datazoom enables the user to call up a customer, "zoom" to the order-transaction file, and scan part orders from that customer. Users can also "zoom" from an order-transaction record to a part-number record for complete information about the



Connections between files are established quickly with the zoom operation, as is shown in this *power-base* illustration.

power-base
Power-Base Systems, Inc.
12 W. 37 St.
New York, NY 10018
(212) 947-3590
List Price: $395
Description: Relational
Requires: 230K RAM, 2 disk drives, DOS 1.1, hard disk recommended.
Records per File: 65,534

CIRCLE 754 ON READER SERVICE CARD

power-base can handle up to ten zoom levels, and the linkages can be set up in various directions from multiple fields. You can see a map of your files and their links on the screen or at the printer.

part. Records can be edited, added, or deleted, at any point in the process.

PB can handle up to ten zoom levels, and the linkages can be set up in various directions from multiple fields. You can see a map of your files and their links on the screen or at the printer.

Every level of activity is fully prompted and the documentation, while excellent, seems almost unnecessary because of the help provided by the thorough on-line prompting.

The menu-driven Datazoom feature enables easy browsing through records, allowing you to examine raw data and the relationships among data.

On-screen fields can be the familiar numeric, alphanumeric, or text types. Additionally, a field on one screen can be the result of a lookup to a linked file, an on-the-fly calculation among fields in several files, or a function (sum, min, max, average) of a subset of fields in linked records.

Retrieval is quick, even among intricately linked files, because of *power-base*'s B-tree indexing.

The Bad News

PB's strengths (as seen in the version reviewed here) are on the input side. Its weaknesses are mostly on the output side.

For example, *power-base*'s report-writing facility allows only one sort level. While this can be overcome with manual intervention (making selects manually at one level and sorting automatically on the second), it is a considerable limitation in a product designed for serious data manipulation.

The report-writing utility is basically not much more than a listing device. It can output to printer or diskfile, and it provides good support for headers and page control. It also allows subtotals and grand totals on selected numeric fields. However, its page-formatting capability is strictly limited to list-type structures.

Ironically, the report writer can not produce documents (such as invoices) from multilevel databases, despite the fact that the documentation's excellent tutorial is based on an invoice system.

Success or Failure

The success or failure of *power-base* will ultimately depend on the release of Version 1.1, which is scheduled for July. Version 1.1 is said to include multilevel sorts, a full-feature report writer (and thus page-formatting capability), a label utility, support for fixed-length records, global replace, and global recalculation. The new version will also support import and export of files in DIF, SYLK, SDF, WKS, BASIC, and ASCII formats.

The reviewed version of *power-base* shows all the promise of a real blockbuster. If the manufacturer delivers on its promises for Version 1.1, I could happily recommend this database management system to anyone with a requirement for simple-to-use, ad hoc data retrieval. However, that's a pretty big *if*.

Version 1.1 should be worth every penny of its $395 retail price. Without the Version 1.1 improvements, however, *power-base* is nothing but a fancy but grossly overpriced index card system.

PC is watching for Version 1.1 and will report on it as soon as possible. Meanwhile, readers might want to wait for Version 1.1, too. —**Richard Aarons**

Dept. number:	Dept. name:	Cost center:	Total employes:	Average salary:	Salary total:
100	Accounting	10000	100	$20508.00	$2050800.00
200	Data Processing	10000	100	$17039.00	$1703900.00
300	Marketing	10000	100	$19165.00	$1916500.00
400	Production	10000	100	$25633.00	$2563300.00
500	Shipping	10000	100	$22322.50	$2232250.00
			500		$10466750.00

Totals and averages can be computed on the fly using *power-base*'s CALCULATED screen.

SALVO: Natural Language Power

```
 Program name: DEPTSAL2

SHOW "          Employees and Salaries by Department" CR CR
LOCAL THIS-DAY (DATE)
STORE TODAY INTO THIS-DAY
SHOW "                          As of " THIS-DAY
BY DEPT
  SORTING DEPT-NAME
  LIST DEPT-NAME FIRST-NAME LAST-NAME CURRENT-SALARY
END-BY
OUTPUT-TO PRINTER
```

This *SALVO* program, called DEPTSAL2, can be used to print fields from the Employee, Salary, and Department files.

When it comes to database managers for the PC, the buzzword of the day is *relational*. Since the success of *dBASE II*, hardly a day goes by without the emergence of another database manager bearing this magic word. As followers of the "Project: Database" series have discovered, the term *relational* is often applied as frivolously to this software as the term *IBM-compatible* is to some hardware. The situation has gotten so out of hand that I fear that the average user wouldn't recognize and know how to take advantage of a truly relational program even if one were at hand.

The *SALVO* program system, from Software Automation, Inc., addresses these concerns head on. Not only is the system truly relational, it also makes complete use of the remarkable flexibility of relational data management; it is easier and more intuitive than any other program I have seen. It is fast, flexible, and unique in many aspects. Unlike many other programs that try (and fail) to meet the needs of both beginners and advanced users, *SALVO* can truly satisfy the needs of an unusually wide spectrum.

SALVO is an acronym for Software Automation Language VOcabulary. The emphasis on automation is evident throughout the system. Ostensibly designed for nonprogrammers, *SALVO* has a simple, menu-driven interface and is quite adept at navigating deep waters with only a midshipman at the helm. The documentation is clear and helpful in explaining the concepts necessary to fully utilize the relational model, and on-line help and tutorials are available for further assistance.

SALVO
Software Automation, Inc.
14333 Proton Rd.
Dallas, TX 75234
(214) 392-2802
List Price: $495
Description: Relational
Requires: 128K RAM, 2 disk drives, DOS 2.0.
Records per File: 32,000 or 1 megabyte

CIRCLE 757 ON READER SERVICE CARD

Creating a Data File

Defining a data file is straightforward. Choosing the File Maintenance option from *SALVO*'s opening menu brings up a menu that includes the choices Create, Revise, Listable (to change the display characteristics of fields), Erase, Export, Import, or Rename. Selecting Create begins the definition process. Each field has a field name of up to 20 characters, a data type, a length, a key type, a list attribute that indicates whether the field will be displayed in certain circumstances, and a prompt/heading, which is used in some outputs.

The data types available are unusually flexible. They include alpha, byte, integer, numeric, dollars, $.CTS (dollars and cents), decimal, and date. All of these data types (except alpha) can be used in calculations. You can specify a minimum and maximum value for any numeric type field; the WITHIN and BETWEEN parameters permit inclusive and exclusive range-checking if desired.

The index key definitions available are the first indication that some unusual things are afoot in *SALVO*. The key types include Nokey (if the field isn't keyed), Primary (for unique keys), Alternate (to "provide an alias identification for each record"), Partial (to combine two partial keys to serve together as a primary key), and Foreign (to identify a record in another file).

Finally, a prompt or heading can be assigned to each field as a label. *SALVO* uses the field name as a default if you

Not only is SALVO truly relational, but it also makes complete use of the remarkable flexibility that relational database management provides.

Employees and Salaries by Department

As of 06/09/84

Department Name	First Name	Last Name	Current Salary
Accounting	Alex	Marshall	$15500.00
Accounting	Eugene	Bradford	$50300.00
Data Processing	Stefano	DiMeara	$25800.00
Data Processing	Herb	Bittner	$45300.00
Data Processing	Mitzi	Matsuo	$30500.00
Data Processing	Roberta	Condon	$45300.00
Data Processing	Alice	Horton	$27500.00
Data Processing	Marlene	Evans	$32100.00
Data Processing	Doug	Williams	$40200.00
Marketing	Liz	Chandler	$46900.00
Marketing	Joshua	Fallon	$51300.00
Marketing	David	Banning	$53500.00

This is the report produced by the *SALVO* program, DEPTSAL2.

don't provide an explicit entry. Function keys are used (as they are throughout *SALVO*) with definitions at the bottom of the screen for help and to perform various functions.

Once the definition is complete, the program checks the schema for validity and compliance with *SALVO*'s rules. Field names must not be used in any other files on the disk you are working with, which sometimes can be a bit of a problem when using a hard disk with many data files. More importantly, at least in the master file, the system requires a unique key, on which other files will be dependent. Some data files lend themselves to this requirement painlessly (a customer file with unique customer numbers, for example), but a bit of tap dancing may be needed to create a unique key for others. You can use various methods to create a suitable key, depending on the nature of the data to be stored. You should give this some advance thought.

Defining a single master file is not terribly different than doing so with other database managers, but defining related files invokes a lovely feature. *SALVO* handles one-to-one, one-to-many, and many-to-many relationships with a combination of graphic representation and prompting that makes the normally complex concepts easy to understand even for users unfamiliar with relational methods. Three levels of relationships are displayed: higher, current, and lower, with the master file as current. A secondary file is first shown above the master file, in the higher position, and you are asked a question that explores the relationship between the two files.

Using the SALESMAN and CUSTOMERS files as examples and assuming that the SALESMAN file has been defined first, *SALVO* would ask if "there could be many CUSTOMERS for each SALESMAN *and* there can be only one SALESMAN for each CUSTOMER." If the answer is yes to both parts of the question, you have established a "one-to-many" relationship between the files. Similar questions would be asked for other types of relationships. As the investigation proceeds, the graphic representation changes to show the secondary file on the same level or below the master file. Once you match the desired relationship, *SALVO* automatically structures the interactions correctly, sometimes inserting the correct key field in the schema for the secondary file. This process can continue for as many files as needed, with quite complex relations defined smoothly and almost transparently.

SALVO requests the key field at the bottom of the screen and checks for unique values before allowing input of the remaining fields.

This is exceptionally easy and leads to efficient and highly relational databases that would probably be beyond the definitional capabilities of even rather advanced users. *SALVO* handles the necessary linkages without the complex programming that would be required in most relational systems (if they can handle such highly linked relations at all).

Data Input

SALVO considers data files to be either active or inactive. An interesting concept is implemented to activate a file. Files can be either extracted from or included into the list of up to 16 active files. If a file is extracted, changes made to the file are not saved unless the file is explicitly saved, while included files are updated as changes are made. This allows you to work with copies of a data file until you are sure changes are accurate. To save time, *SALVO* can extract or include an entire group of related files—a nice idea.

Entering data uses the REQUEST module, an option on the main menu. REQUEST is used for the natural language input that *SALVO* can accept. To input information into a CUSTOMER database, you would merely type UPDATE CUSTOMER. Active files are shown in a screen window to indicate which files are available for update.

The entry process itself holds no surprises. The key field is requested at the bottom of the screen, and *SALVO* checks for unique values before allowing input of the remaining fields in the upper portion of the screen. *SALVO* immediately rejects

duplicate keys and field values outside any specified limits. Fields are requested vertically down the left margin. Previous records remain on the screen, a design I have long preferred, because it helps you to avoid losing your place when entering lists of data. Extensive use is made of video attributes on a monochrome monitor to make the entry process visually attractive and clear (color displays use color in a limited way for differentiation of prompts and data, but the mono display is far better). Once all the data are added, the program displays all the records that have been input, already sorted into primary key order.

Trade Barriers

My first problem with *SALVO* occurred when I began the process of loading the three *PC* data files for systems in this class. *SALVO* has EXPORT and IMPORT commands, so I expected no major difficulty. These commands, however, permit only files in the DIF interchange format. Even worse, *SALVO* uses an idiosyncratic DIF formatting method that requires three DIF files to effect a transfer. The first defines the file characteristics, the second the field layout, and the third contains the actual data. The first two can be prepared by creating a matching file spec and using the EXPORT function, then IMPORT is used to bring the foreign data over. I was unable to make the process work using the *PC*-supplied DIF files. I suspected that these files were not totally correct, but I had no way to check for sure.

Accordingly, I typed 25 records in each data file into *SALVO* by hand. While the *SALVO* timing benchmarks are thus not comparable to some of the competitive products, it did allow me to test the other aspects of the system.

The EXPORT-IMPORT capabilities are clearly one of the weakest aspects of *SALVO* (the only major problem I had with the program, in fact). Software Automation recognizes the problem and promises expanded and improved handling of foreign files in a future release.

Natural Language Requests

Once data have been entered, you can explore the real power of *SALVO*. It has three main methods of accessing and retrieving information: natural language requests, graphic views of the data file relationships, and the *SALVO* programming language.

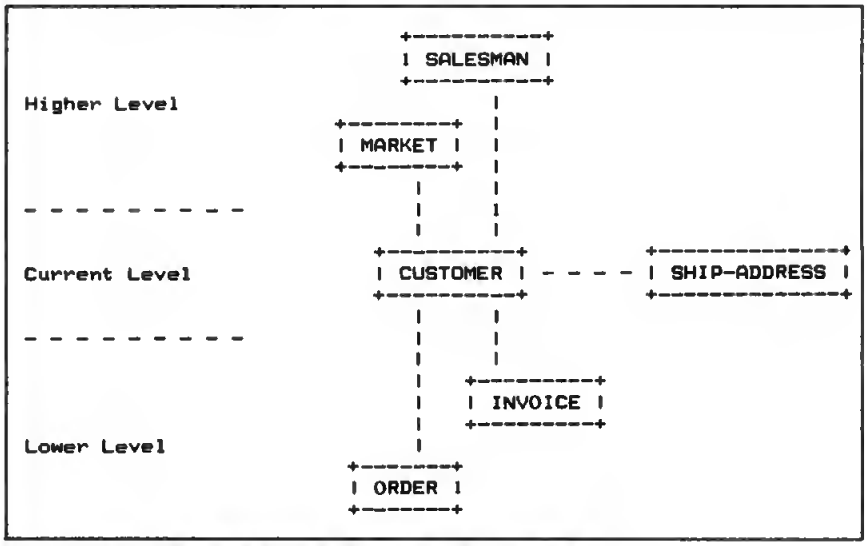
Some years ago, I worked on an early natural language interface that generated accounting programs. It was somewhat surprising to me how relatively simple a natural language interface could be, provided reasonable restrictions were placed on how natural the language input could be. Even working in the relatively unsophisticated CBASIC, I was impressed with the power of natural language. Since then, I have wondered why more products have not taken advantage of these techniques.

Like any microcomputer natural language system, *SALVO* parses an input line looking for key words it has been programmed to recognize. These include some synonyms for common words, while many connective words are simply ignored. Connectors make the language input seem more natural even if they have no effect. Certain prepositions can be used to change the sense of the request. A few words are forbidden, usually because they are question-type words that could generate requests beyond the scope of the program.

While the number of words seems a bit limited (especially in the current release), you can formulate some rather complex requests to *SALVO*. A request such as LIST THE RETAIL CUSTOMERS FOR SALESMAN BAKER AND THEIR ORDERS AND PARTS will actually access four separate data files and produce a nicely formatted screen display complete with windowing!

The request must fit on one 78-column line and cannot be edited if an error is made. The output displays *SALVO* creates are very usable. Different request verbs, such as DISPLAY, LIST, GET, and SHOW, produce different report formats, some horizontal and some vertical. They do not include subtotals, grand totals, counts, or other aggregate functions, however.

When a request is entered, *SALVO* actually creates a program in the *SALVO* language and then executes that program. The program is stored in a file named TEMP. After execution (or before if the word VERIFY is included in the request), this program can be examined, modified, and saved in a permanent disk file for repeated execution. The compilation of



***SALVO* displays file relationships grsphically on the screen.**

Input Screen Specifications

Method	Capabilities				
	No. screens per file	No. files per screen	Simulate paper forms	Link help messages/ prompts to a field	Master/detail relationships
Automatic/ programmable	Unlimited	Unlimited	Yes	Yes	Yes
User "paints" screens guided by system's prompts. Screens can be redrawn at any time.	Unlimited	Unlimited	Yes	Yes	Yes
Automatic/ programmable	Unlimited	Unlimited	Yes, with high-level programming	Yes, one prompt linked to each field	No
Automatic, "painted," and programmable.	Unlimited	Unlimited	Yes, using either screen generetor or BASIC.	Yes, can include help prompts at the field level and additional text within the body of the screen.	Yes, at the field level as well as at the record level
Automatic, "painted," and programmable.	225	10	Yes	Yes	Yes
Automatic, "painted," and programmable.	Unlimited	Unlimited	Yes	Programmable	Yes
Automatic/ "painted"	Unlimited	10	Yes	Programmable	Yes
Autometic and programmable. *KPaint* option generates screen code.	Unlimited number of screens can be brought into RAM with local variables and released when no longer needed.	Unlimited	Yes	Yes. Additionally, a "bad" entry in the field can be made to change the field's color.	Yes, created on the fly. Does not require fixed links.
Automatic/ programmed. Can "paint" with dFORMAT utility.	Unlimited	10	Yes	No	No

1. Follow Instructions on the other side

Inverted Back

Back

1. Follow instructions on the other side

Folded edge of the page

GbsSlipSheet-001

Inverted Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
    1. Front side touching the free page
    2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

Folded edge of the page

GbsSlipSheet-001

Foldout slip-sheet

1. Open the foldout page
2. Insert this sheet with
    1. Front side touching the free page
    2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet

PROJECT DATA BASE

Name	Data Model	Marketing Features		
		Length of Time on Market	Number of Sales	Price
SAVVY PC Excalibur Technologies Corp. P.O. Box 26448 Albuquerque, NM 87125 (505) 242-3333	Relational	Since January 1984 for the IBM PC	Confidential	$395
power-base Power-base Systems, Inc. 12 W. 37th St. New York, NY 10018 (212) 947-3590	Relational	Since December 1983	Confidential	$395 plus $25 for necessary backup.
SALVO (Version 1.0) Software Automation, Inc. 14333 Proton Rd. Dallas, TX 75234 (214) 392-2802	Relational	Since January 1984	Over 3,000	$495
Revelation Cosmos, Inc. 19530 Pacific Hwy. S. #102 Seattle, WA 98188 (206) 824-9942	Relational	Since March 1983	4,000	Complete system – $950, run-time system – $450, extra manual sets – $40.
DataFlex (Version 2.0) Data Access Corp. 8525 SW 129 Terrace Miami, FL 33156 (305) 238-0012	Relational	Since September 1983	8,000	$995 for 16-bit machine single-user version, $1,250 for 16-bit multi-user version.
PC/FOCUS Information Builders, Inc. 1250 Broadway New York, NY 10001 (212) 736-4433	Hierarchical	Since June 1983	4,600	$1,595
informix (Version 3.11) Relational Database Systems, Inc. 2471 E. Bayshore Rd. Suite 600 Palo Alto, CA 94303 (415) 424-1300	Relational	Since January 1981	Over 10,000, mostly on UNIX systems.	$795
KnowledgeMan (Knowledge Manager) Micro Data Base Systems, Inc. P.O. Box 248 Lafayette, IN 47902 (317) 463-2581	Relational	Since May 1983	15,000	*Knowledge Manager* – $500, *KGraph* – $100, *KPaint* – $100, *KText* – $100.
dBASE III Ashton-Tate 10150 W. Jefferson Blvd. Culver City, CA 90230 (213) 204-5570	Relational	Since mid-June 1984	Not yet available	$695

Editor's Note: Dash (—) indicates "not applicable."

the *SALVO* program takes only a few seconds.

Generating requests and looking at the programs that result is a terrific way to learn the *SALVO* language. The language itself is reasonably straightforward, but modifying request programs makes the operation of the language almost obvious to anyone who has programmed at all. The brevity of the programs generated is a testimony to the power of the *SALVO* language, and simple modifications to the short programs can customize output to almost any degree.

The VIEW Module

Another way of retrieving information is the VIEW module. As I discussed earlier, *SALVO* displays the relational structure of a complex database. Even a six-file system is easy to structure and use.

The VIEW module allows you to request information from any of the files displayed by moving the cursor to a file and hitting R for retrieval. Similarly, updates can be made to any of the displayed files by typing U. When you choose retrieval, *SALVO* builds a natural language request on the screen, which, in turn, is passed to the program generator to create a program for execution. As always, the resulting program can be edited and saved.

The VIEW module uses an interesting "navigation algorithm" to build its natural language request. The system is capable of generating requests across the relational structure, which might not be accepted by a user-input request.

The *SALVO* Language

SALVO provides a full-screen editor to enter or edit programs. The editor can be invoked directly from a menu, or can be reached after a REQUEST-generated program has been executed or after an error has occurred in a request or program. *SALVO* programs are divided into screens of 14 lines of 72 characters each, but these short programs can be nested and chained together as well. Given the amount of work that can be done by even a short program, few *SALVO* programs will be long anyway.

The editor uses the cursor movement and function keys to control editing. The editing capabilities are rather limited compared with free-standing editors or word processors, but the *SALVO* editor is usable for short programs. An annoying feature is that it doesn't use the Ins and Del keys on the IBM keypad, so you'll need to familiarize yourself with it before you can edit smoothly. One nicety is a List/Pick function that displays filenames and field names and allows the programmer to select desired elements with the cursor keys for direct inclusion into the program text.

SALVO has three main methods of accessing and retrieving information: natural language requests, graphic views of the data file relationships, and its programming language.

The language itself is intertwined with *SALVO*'s style of relational data management. It is not a general-purpose language and would not be a good replacement for a normal high-level language (the way some people use *dBASE II*'s language, for example). But as a data manipulation tool it is excellent. The syntax is terse, yet expressive and powerful. You can perform a great deal of useful work with only a few commands. The authors of many such languages claim, as does Software Automation, that complex application systems can be programmed using their languages in much less time than with COBOL or BASIC. This claim surely stands up for *SALVO*.

Performance

With the short 25-record *PC*-supplied files, performance of almost all *SALVO* functions was essentially instantaneous. Even reports that accessed all three sample data files simultaneously did not generate any delays. Accessing data was simplicity itself, whether the natural language system or the graphic VIEW module was used. Modifying the resulting *SALVO* language programs was equally easy.

Programming from scratch in *SALVO* took a bit of practice, but this would be the case with any new high-level language. The output programs from REQUEST and VIEW modules were tremendously helpful as learning tools, although some detailed examples in the manual or on disk would have been helpful as well.

Summary

I like *SALVO*. In a time of one look-alike database product after another, *SALVO* has not just one but many unique, fascinating, and useful features. It is difficult for me to evaluate whether *SALVO* is up to truly major program development like complete accounting applications and some of the other serious applications that have been programmed in competitive database managers, but I believe *SALVO* could handle the job.

One appealing aspect is that all this power and flexibility runs smoothly and uneventfully. Some of the large database systems ported down to the PC from minis and mainframes simply overwhelm the limited computing horsepower of the PC. Combined with reasonably good documentation, fine on-line help facilities, good factory support, and a reasonable price, the unique features and good performance of *SALVO* make it worth careful consideration. —**Glenn A. Hart**

(Text continues following the Database chart.)

Entry Editing Capabilities

None	Range Tests	Specific Values	Default Values	Table Lookup (To an Outside File)	Verify (Requires Data to be Input Twice)
—	Yes	Yes	Yes	Yes	Yes
—	Yes	Yes	Yes	Yes	No
—	Yes	No	No	Yes, can check for duplicate primary key value in external file.	No
—	Yes	Yes	Yes	Yes	No
—	Yes	Yes	Yes	Yes	Programmable
—	Programmable	Programmable	Programmable	Programmable	Programmable
—	Yes	Yes	Yes	Yes	Yes
—	Yes	Yes	Yes	Yes	Programmable
—	Yes	No	No	Programmable	No

Entry Editing Capabilities (cont'd)			Adaptation to PC		
Required Field	Date Tests/Date Conversion	Other	ASCII Characters Only	Graphics Symbols	Color
Yes	Programmable	Programmable	No	Yes	Yes
Yes	Yes	No	Yes	No	Creates a green border around all screens. No other use of color.
No	Yes	No	Yes	No	Yes, displays text using high- and low-intensity blue on color monitors.
Yes	Yes	Money and time fields.	Yes	Programmable	Yes
Yes	Yes	Has I/O editing masks and string functions such as convert-to-caps	Yes	No	No
Programmable	Programmable	No	Yes	Yes	No
Yes	Yes, accepts several formats.	Upper- and lowercase highlights, justify, and zero fill.	Yes	No	No
Programmable	Programmable	No	Yes, but special characters can be used in editing masks for I/O.	Any ASCII or special character can be used in editing masks for I/O.	Yes
No	Yes	PICTURE clauses can restrict and transform input.	No	Yes, used in formatting screens.	Yes. Foreground, background, and border colors can be changed.

DOS 2.x Subdirectories	Alternate input Methods (mouse, etc.)	Files Across Multiple Drives	Function Keys	User Interface	Files: Methods of: Data dictionary or other means
No	No	Yes	Yes	An adaptive pattern recognition processor corrects errors and finds information.	Data dictionary
Yes	No	No	Yes	Prompting with a tree menu structure	During screen painting, prompts request field information, which is held in 3 system files
No	No	No	Yes	Uses visual representation, prompting, and natural language commands.	Data dictionary
Yes	No	Yes	Optional	Menus/ commands	Data dictionary
No	Yes, mouse *DataFlex* uses the TERM feature of DOS 1.1 or the ANSI SYS driver of DOS 2.0.	No	Yes	Uses visual representation, prompting, and natural language commands.	Data dictionary with B-tree ISAM indexing
Yes	No	Yes	Yes	Visual/verbal	Data dictionary
Yes, has its own commands to locate all parts of the database	No	Yes	Yes	Menus/natural language	Yes, database schema are built up from individual file dictionaries that were entered via an editor.
Yes	No	Yes	Yes	Simple or complex prompting, IBM SQL/DB natural language.	Yes, data definitions held in data file headers
Yes, sets up own search paths.	No	No	Yes	Visual/prompting	Yes, file schema stored in binary header, which is part of data file

Files (cont'd)

Specification	Things You Can Specify				
Must files be built/modified only from data dictionary?	**None**	**Field data**	**Tokens, aliases, or synonyms**	**Index data**	**Permissions/security**
Yes. Individual items can be created at any time, added to dictionary, and then used in future file definitions.	—	12 types, including state, phone, and social security numbers. Others are programmable	Yes, an automatic feature of the adaptive pattern recognition system	Yes	Yes
Files are updated continuously as data are added or delated	—	Alphanumeric, numeric, dollars, logical.	No	Yes, up to 6 fields per file.	No
Yes	—	Yes	No tokens or synonyms. Alternate keys are called Alias keys	No	No
Yes	—	Almost every aspect can be specified, including multi-occur indicator, master detail code, left-right justification, and output display conversion	Yes	Yes, but not dictionary function.	Yes, but not dictionary function.
Yes	—	Yes	Yes, aliases can be used for file names and fields.	Yes, 9 indexes per file. Indexes are updated after each record entry.	Programmable
Yes	—	Yes	Yes	Yes	Yes
Yes	—	Element name, 1 of 11 data types, length of character strings	Yes	Yes, can add or delete indexes directly, can allow duplicate keys.	No
No, files can be built or modified at any time	—	String, numeric, and logical.	Yes, can be created through the use of macros	Yes, any field can be indexed, no limit to the number of active indexes	Yes, provides extensive security down to field level
No, but must be using *dBASE III*	—	Yes	Programmable	Yes, up to 7 index files per data file	Programmable

Encryption	Relations	Validity tests	Error or prompting messages	Multiple views of database	System: Maximum No. Record Types per Database
Yes	Yes	Yes	Yes	Yes	Limited by disk space.
No	Yes	Yes	Yes	Yes	10
No	Yes, primary, alternate, partial, and foreign key types are specified for each field.	Yes, validity of entire data structure is checked when schema is input.	Yes, if data structure is incorrect.	Yes, has excellent system for changing view of overall database structure.	14–16 files at any one time; up to 100 files may be related.
Yes, but not a dictionary function.	Yes, any number of files you wish.	Yes, with an extension to BASIC if needed.	Yes	Yes	Limited by disk space.
No	Yes, pointers are stored in the data dictionary.	Yes, validity testing is done at system level for violations of data dictionary elements and at programming level for routine I/O.	System generates trapable error messages.	Yes	125
Yes	Yes	No	No	Yes, a multisegment file may have alternate viewing points set up at various segment levels.	64
No	Yes	No, done at the form level instead.	No, done at the form level instead.	Yes	Limited by disk space.
Yes, all data files are encrypted automatically. Procedure files can be encrypted.	Yes	Yes	Yes	Yes	Limited by disk space.
No	Yes, with new SET RELATION command.	No	No	No	Unlimited, up to 10 open at one time.

Specifications					Error Handling
Maximum No. Fields per Record	Maximum Record Size	Maximum No. Records per File	Maximum No. Records per Database	Maximum Field Size	
254	1,018 bytes	20,000	204,180,000	255 bytes	Field-by-field, total, and selective reprompting
64	1,600 bytes	65,534	65,534	80 bytes	Field-by-field
16	1,019 bytes	32,000 records or 1 megabyte total file size.	512,000	78 bytes	Field-by-field, total, and selective reprompting
Limited by disk space.	65,530 bytes	Limited by disk space.	Limited by disk space.	65,530 bytes	Programmable
255	4,000 bytes	65,536 bytes	8,192,000	255 bytes	Programmable
250	4,096 bytes	Limited by disk space.	Limited by disk space.	255 bytes	Field-by-field is default; other methods are programmable.
2,048	2,048 bytes	Limited by disk space.	Limited by disk space.	2,048 bytes	Field-by-field and total reprompting.
255	65,535 bytes	65,535 bytes	Limited by disk space.	65,535 bytes	Field-by-field, total, and selective reprompting.
128	4,000 bytes in datafile, 512 kilobytes in memo text files.	Limited by disk space.	Limited by disk space.	4,000 bytes	Field-by-field and selective reprompting.

Data Types and Maximum Sizes

Character	Numeric				Date
	Integer	Floating point	Money or dollars	Other numeric	
255 bytes	63 digits	Range: $\pm 10^{63}$	Yes	No	Programmable
80 bytes	8 bytes	8 bytes	8 bytes	No	Yes
78 bytes	Range: ±9,999	9 digits	9 digits	Byte type handles from 0 to 225, numeric type handles values ± 999,999,999	Yes, in form MM DD/YY System date is available
65,530 bytes	14 digits	Range: $\pm 10^{\pm 4932}$	Yes	No	Yes
255 bytes	Range: ±32,767	No	4 digits	Packed BCD fixed point with 4-decimal-place precision	Yes
255 bytes	9 digits	9 digits in single precision, 15 digits in double precision.	9 digits in single precision, 15 digits in double precision	No	Yes
2,048 bytes	Range: ±32,768	7 digits in single precision, 14 digits in double precision	Stores internally as double precision floating-point value. Will always be exact to nearest cent	No	Yes
65,535 bytes	Range: ±32,896	14 digits	No. Is specified with I/O edit mask	The value of a numeric field determines whether it is integer or floating point	Yes
254 bytes	No	19 bytes, uses 8087 chip if present	No	No	Yes

Types/Sizes (cont'd)		Demo Version			Data Importing
Time	Logical	Available?	Cost	Limitations	
Programmable	Yes	Yes	$9.95	20K database	Programmable
No	Yes	No	—	—	Programmable
No, but system time is available.	Yes	Yes	$49.95	50-record maximum and 5 files open at one time.	DIF format only, with special requirements.
Yes	Programmable	No	—	—	SDF, nondelimited ASCII sequential, *dBASEII* files, and almost any others with programming. Can also link to another system running *Revelation* or the PICK operating system
Yes	Yes	Yes	$100	25-record maximum	Programmable
No	Programmable	To dealers only	—	—	Fixed format or comma-delimited standard ASCII files and mainframe FOCUS files.
No	No	Yes, included with system.	—	—	Special ASCII delimited, can specify delimiter
No	Yes	Yes	$50	15 records	DIF, BASIC, ASCII, and unquoted ASCII
No	Yes	Yes	$9.95	63-record maximum	SDF and many special delimited formats.

Data Exporting	Advanced Features				
	Back-up-Ability/ Copy Protection	Audit Trails		Data Restructuring	
		Pre/post imaging	Activity or transaction log	Technique (inherent/ separate program)	Adding or changing indexes
Programmable	Yes	Yes	Yes	Commands are inherent, but task must be programmed.	Yes
Programmable	All diskettes except primary "USE" diskette may be backed up.	Yes	No	Inherent	Yes, at any time.
DIF, and standard ASCII; also programmable.	No	No	Programmable	Inherent	No
Same as importing except no *dBASE II* export.	No	Programmable	Programmable	Accomplished through dictionary update and occasional BASIC program.	Yes, but normally uses direct-access hashing or a "select-list" of keys.
Programmable	Must back up all data files and associated files and run-time modules together.	Programmable	Programmable	Separate	Yes
Fixed format and comma-delimited files. Standard ASCII files, DIF, and *1-2-3* PRN files.	The 11 program diskettes may be copied, but noncopyable "Activator" diskette must be present in Drive A: at boot time.	Programmable	Yes	Inherent	Yes
Special ASCII delimited; can specify delimiter.	Yes. This one is built for real database security.	Yes	No, not needed with full imaging.	Separate	Yes
DIF, BASIC, ASCII or unquoted ASCII; others are programmable.	Yes, in query language mode or within a procedure.	Programmable	Programmable	Inherent	Yes, at any time.
SDF, special delimited formats, and programmable.	Programmable	No	Programmable	Inherent; does not erase all data, but reloads existing data.	Yes

Adv. Features (cont'd)		Report Generation			
Linked or Multiple Update of Indexes and Files	High-level Language &/or Product Interface	Capabilities			
		Sorting	Aggregates (min., max., count, avg., percent, etc.)	Arithmetic (-, /, +, –)	Parameter passing
Yes	Yes	Unlimited number of sort fields	Yes	Yes	Yes
Yes, this is one of the stronger points of this product.	Yes, to BASIC.	Does not sort, indexes only	Yes	Yes	No
Yes, system can update multiple linked files almost transparently to user.	No	1 sort field	No	No	No
Yes, on any number of files.	Yes, to R:BASIC, a full implementation of compiled BASIC that follows the structure of PICK BASIC with significant language extensions and new features.	Any combination of ascending and descending fields.	Direct verbs to sum, count, and do simple averages. More complex formulas can be coded into the data dictionary.	Yes	Yes
Yes	Yes, to Digital Research's Pascal. *DataFlex* is written in Pascal.	Does not sort, indexes only	Yes	Yes	Yes
No	No	Up to 32 sort fields.	Yes	Yes	Yes
Yes, controlled by multifile screen forms.	Has a comprehensive library of C routines.	Multiple sort fields, ascending and descending. Can even sort on part of a character string.	Yes	Yes	Yes
Programmable	Interfaces with BASIC or products using supported import/export techniques.	Unlimited number of sort fields.	Yes, can be treated as memory variables.	Yes, all math and logical operators except exponentiation are supported.	Yes
Yes	Enhanced *dBASE* programming language.	New high-speed, multikey sort.	Count, sum, and average, others programmable.	Yes	Yes

		Query Language			
Flexibility of output	Multifile access	Mass additions, deletions & updates	Load and unload	Execute stored scripts	Quality of output
Very flexible	Yes	Yes, via underlying *SAVVY* language.	Yes	Yes	Good
Excellent with single file, more difficult in master detail relationships	Yes	Mass deletions are supported, mass additions are not	Yes	No, but can use *ProKey* scripts.	Menu-driven, quite effective
Good, program generates good columnar and other formats	Yes	Yes	No	Yes, using stored *SALVO* language programs	Quite good
Basic format of reports is columnar, but more elaborate formats are programmable	Yes	No	Yes, but not a query function	Yes	Excellent, but slow at scanning file
Highly flexible but complex	Yes	Can be done from report writer, not from query language	Yes, but usually done by report writer	Yes	"Flex-Key" system uses function keys for select and edit routines
Very flexible	Yes	Yes	Yes	Yes	Fine
Very flexible	Yes	Yes	Yes	Yes	Excellent
Output procedures are complex but flexible.	Yes	Yes	Yes	Yes	Excellent
Any output form is programmable	Yes	Yes	Yes	Yes	Good

Report Generation (cont'd)					Procedural Language
Query (cont'd) Other	Report Formatter/ Generator	Screen Dumps	Other	Built-in Applications or Examples	
No	No	Yes	No	Yes, sample databases on diskette	Yes, tasks are user-defined and are composed of factory-supplied commands.
Query language is English-like. Queries can be made with menus or commands.	Very limited; only lists can be output.	No	No	Yes, including a telephone/address/ personal information log, a stock transaction tracking system, and a project planning system.	No
Natural language queries generate *SALVO* language program that can be further manipulated.	No, but can be programmed in *SALVO* language.	No	No	Demonstration files and examples are excellent models.	High-level language provides excellent flexibility for complex data manipulations with advanced relational techniques.
Query can build selected and sorted key lists for use by other query functions or BASIC programs.	Yes, provided in the Application Builder system.	No	No	Yes, sample database used throughout tutorial.	One of the finest implementations of BASIC I've ever seen.
"Flex-Key" system uses function keys for the database select and edit routines.	Highly flexible and complex. It can generate output for any media in any format.	Yes	No	*DateFlex* comes with several sample business applications.	Powerful, but difficult to learn, because commands are literally a mixture of Pascal, COBOL, and BASIC.
No	The TABLETALK function is a built-in report generator that simplifies report definition.	Yes	Financial modeling feature, user-written subroutines.	Yes	The entire system is a procedural language.
Can create temporary files, assign field name synonyms, add/delete index files, set up input prompts.	Yes, the ACE report writer is almost a complete programming language.	Yes	Includes if-then-else logic, subroutines, C interface, full format control.	Yes, package comes with two sample databases.	Does not have a procedural language. If it did, it would be unbeatable.
Uses a superset of IBM's SQL/DS query language.	Yes	Yes	*KMan* has built-in spreadsheet. Cells can be used as table fields or memory variables.	Yes, checkbook management system and an investment time/value analysis system.	Quite powerful. Debugging modes are available.
No	Yes	Yes	No	Yes, complete accounting example.	Yes, updated and enhanced version of *dBASE II* language.

Performance Measurements

Time to Enter Standard Info	Time to Execute Standard Task	Time to Perform Sort	Time to Extract Random Records	Size of Database Created	
				Number of records in employee file	Space compression
Limited by typing speed.	2 minutes, 52 seconds.	5 minutes, 59 seconds using 680 records and 495 employees	1 second	495	Yes
8 minutes to define files and input form; 11 minutes to import 25 records.	25 minutes	Not applicable; program indexes rather than sorts.	1–4 seconds	25	No
Limited by typing speed.	Several minutes	Almost immediate	Almost immediate	25	No
10 minutes	1 hour, 7 minutes.	About 2 minutes for 3-field sort	Almost immediate	500	Yes
Required 4 steps taking a total of 1 hour, 6 minutes.	1 hour	8 minutes	Less than 1 second	500	Yes, on numeric fields.
3 hours to develop instruction the first time, followed by 1 minute to import. Future instruction development would take 10 minutes.	10 minutes	1 minute, 10 seconds.	1 second	500	Yes, space is managed tightly.
1 hour	30 minutes	25–40 seconds, depending on sequencing	Less than 1 second for indexed access.	640	Defined numerics are compressed, but strings are not.
2 minutes to write the batch routine; 3 minutes, 45 seconds to load all 3 files.	2 hours, 15 minutes.	1 minute, 16 seconds.	1 to 4, unindexed; less than 1 second indexed.	500	Only after records are deleted.
1 minute, 45 seconds.	8 minutes, 30 seconds.	44 seconds	Almost immediate	500	No

Performance Measurements (cont'd)					Hardware/
Size (cont'd) Variable length of fields	Number & Size of Ancillary Files	Degradation with Additional Indexes	Time to Create a Standard Report to Screen	Time to Execute a Standard Report to Screen	Minimum Configuration Required
Yes	2 files; 1 with 249 records, 1 with 263.	None	15 minutes	2 minutes, 52 seconds.	64K at reduced speed, 1 drive. *SAVVY's* own operating system
No	Directory file was 512 bytes. The KEY and MAP files for each database vary in size.	Yes	4 minutes	20 minutes	230K, 2 drives, DOS 1.1. Hard disk recommended
No	None	Uses only primary indexes.	2–3 minutes	Began immediately.	128K, 2 drives, DOS 2.0.
Yes	3 dictionary files of 500 bytes each	None	15–20 seconds	1–2 minutes before printer starts, depending on complexity and sort requirements.	320K, 1 drive, DOS 1.0, 8087 chip.
No	Each program has one or more data files, index files, and field-name files ranging in length from 128 to 52,224 bytes.	Negligible	1 hour and 30 minutes for new user, much less for experienced user	About 15 minutes	100K, 2 drives, DOS 1.0.
No	2 files, 1 with 640 records, 1 with 680.	Negligible	2 minutes	2 minutes	512K, 5-megabyte hard disk, DOS 2.0. 10-megabyte disk recommended
No	Index files average 20 percent of primary file.	None	Less than 5 minutes	1–1½ minutes	256K, hard disk, DOS 2.0.
No	None needed for query language operations. Each index requires its own file.	Negligible	30 minutes	5 minutes	192K, 1 drive, DOS 1.1. Hard disk recommended
On memo text fields only.	None, unless indexing is used.	Moderate; less than with *dBASE II*.	5 minutes	7 minutes	256K, 2 drives or 1 drive and hard disk, DOS 2.0.

Software	Subjective Evaluations				
Configuration Used in Testing	Documentation	Program Robustness	Flexibility/ Ease of Use	Would You Buy This One?	Would You Accept It as a Gift?
512K, 2 drives, DOS 2.0.	Very good. Very comprehensive tutorial, but some small errors that may create confusion	Robust	Very flexible, moderately easy to use	Not my first choice	Definitely
440K, 20-megabyte hard disk, DOS 2.0.	Excellent except that invoice system example used in tutorial cannot be printed	Robust	Ease of use excellent. Flexibility is limited by constraint of menu-driven format	Definitely for certain canned applications, but only the upcoming Version 1.1	Yes, for canned applications, but only Version 1.1
640K, 2 drives, 35-megabyte hard disk, DOS 2.0.	Well written but no index. On-line help system excellent.	Robust	Excellent	It is an excellent program, but I still prefer *Revelation* or *dBASE III*	Yes
640K, 1 drive, DOS 2.1, 8087 chip, 10-megabyte hard disk.	Excellent organization, many examples. A better index would be a big help.	System doesn't crash in normal operation. Access to a real-time debugger is very helpful.	The Application Builder System is powerful, easy, and fun. The real power comes when you shift to R/BASIC.	Yes, even if I had to borrow the money.	Yes
440K, 20-megabyte Tallgrass hard disk, DOS 2.1	Complete, but seems to jump around without giving the user the big picture	Good	The cost of its great flexibility is a high degree of complexity	Yes, if I needed a multi-tasking system or were working in an environment of mixed machines and operating systems	Yes, if had conditions listed at left
640K, 10-megabyte hard disk, DOS 2.0	Massive. To understand the documentation completely requires some understanding of computers and databases	Very robust	Extremely flexible, but not easy to master	Yes, if my application required this much functionality or if I were a mainframe *FOCUS* user	Definitely
640K, hard disk, DOS 2.11.	Text is clear and complete. Diagnostic message content and debug are poor	A mature, well-tested product. To break it, you really have to work at it	Very easy to work with, particularly considering the power of the system. Only serious flaw is lack of a procedural language	Yes, for easy manipulation of a complex relational database. *informix* is tops	Yes, *informix* is great at what it does
448K, 20-megabyte hard disk, DOS 2.0	Excellent for the professional, difficult for a beginner	Fair. The program is tremendously complex, therefore a lot can go wrong	Taking advantage of its great flexibility takes professional care and knowledge	I already have.	Yes, *KMan* was the only thing on the market that had the flexibility I needed
640K, 2 drives, 35-megabyte hard disk, DOS 2.0	Pre-release documentation better than *dBASE II*'s, but still needs more examples	Seems solid	Excellent ASSIST, a menu-driven aid	Yes, this one or *Revelation*	Yes

PROJECT DATA BASE

Revelation: Industrial Strength for the PC

```
                          REVELATION

                       R/DESIGN MAIN MENU


NEXT -> (1)  DEF       Define and Create a File
        (2)  BUD       Build a Dicitionary for a File

        (3)  PGMR      Set up a New Program
        (4)  SEL       Select Fields to be Displayed
        (5)  SCR.GEN   Generate a Standard Screen
        (6)  SCR       Customize an Existing Entry Screen

        (7)  ENTER     Enter Data Using a Program

        (8)  DOC       Produce Application Documentation
        (9)  GEN       Generate R/BASIC Code
       (10)  BLD.MENU  Build Menu
        (0)  TCL       Return to REVELATION Command Level


        Press ENTER key for selection Number 1 or
        Enter your selection number?
```

The R/DESIGN main menu selections demonstrate that *Revelation* is an applications development tool, not an end-user's package.

Industrial strength software has finally arrived for your PC. *Revelation* by Cosmos is the most comprehensive and powerful database manager available today. More than just a data management system, *Revelation* includes an integrated application generator, a complete BASIC compiler, network and conversion utilities, and its own editor. While *Revelation* runs on an MS-DOS system, it provides its own operating environment with a unique file structure and command language.

If you are familiar with the PICK operating system (available for many minicomputers), you will recognize *Revelation*. Cosmos has built a PICK lookalike for the PC. It has all of the functional capability of the minicomputer versions and can also execute DOS commands at any time while remaining within the *Revelation* system. You get the best of both, just for the asking.

This system operates in two modes, one for the novice and the other for people who can program. Without coding skills, you can set up a complete application with menus, entry screens, file management, and reports. R/DESIGN is a menu-driven application generator package that walks you through creating a database file, constructing the data dictionary, defining data entry screens, defining report output displays, customizing standard screens and reports, and building selector menus.

The entire process runs from a ten-item menu that automatically steps you along from one process to the next. It is not as simple as it first seems; some of the concepts are strange to a PICK newcomer. Nonetheless, it works well and puts considerable power at the disposal of s nontechnical user.

Although you can create an entire system using R/DESIGN without learning to program, if you stop there, you will miss *Revelation*'s real thrill: the chance to work with a system that has data management and file manipulation features more advanced than those of other products in this survey.

Revelation's real thrill is the chance to work with advanced data management and file manipulation features.

Revelation
Cosmos, Inc.
19530 Pacific Hwy. S. #102
Seattle, WA 98188
(206) 824-9942
List Price: $950
Description: Relational
Requires: 320K RAM, 1 disk drive, DOS 1.1, 8087 chip.
Records per File: Limited by disk space.

CIRCLE 759 ON READER SERVICE CARD

Dictionary Terms

The *Revelation* database structure uses variable-length fields grouped into variable-length records. Each data field is just long enough to contain the stored data—no padding. This arrangement produces a dramatic compression of files, compared with any of the better-known database packages that store records as fixed-length strings. Each file in the *Revelation* database has an associated dictionary that can carry over a dozen items of information about each data element. The dictionary is used by the program's query language to control access to each field and the manner in which it will be displayed. To add new elements to a file only requires adding the definition to the dictionary. Since everything is variable in this system, you seldom need to reload the database. In fact, no utility function for that purpose is included in the package. The data dictionary is unique in several ways; it contains all of the relational statements that specify the joining of two or more files, so that using the element name in a query allows you to join them "on the fly," without having to create a third file. If you have ever labored through this process in other packages, you will really appreciate this feature. All you do is enter a dictionary term that means "find the department number of the current record, look it up in the department name table, then display the matching department name." If that term is labeled DEPNAME, you can list the EMPLOYEE file and see the name of each person's department, just as if it were stored in the employee record. You don't do a join: the system does it for you whenever that term is referenced in a query. One query request can join many files in this manner to produce the requested output, all in one step.

The other unusual feature of the *Revelation* dictionary is its ability to store a complete BASIC program in a dictionary term record. If you call for that term in a query, you are executing a program that will then create the data to be displayed on the report. The program could analyze data in many files and perform multiple computations in order to arrive at the required answer on the output document. This is real power, folks, not just another pretty report writer.

R/LIST

The query processor is called R/LIST, and much of the first volume of the manual is devoted to its use. The query language is simple in structure, but powerful in execution. The primary R/LIST commands are LIST, SORT, SELECT, and SSELECT. Each command references only one file in the database. The balance of the command line consists of field names (dictionary terms) and various operators. The LIST and SORT commands produce output on either the screen or the printer; both may sort the result on multiple fields (both ascending and descending) without creating another file. A typical R/LIST command line might read:

```
LIST EMPLOYEE WITH
  HIRE.DATE >
  '02/01/83' NAME DEPNAME
  JOBTITLE
```

This will print a report showing data drawn from three different files all at once (no intermediate join file is created). Using the dictionary example, DEPNAME specifies the extraction of the proper department name from a table keyed to the department number stored in the employee's record. Similarly, the dictionary term JOBTITLE calls out the text title matching the job code stored in the employee file. These dictionary terms are stored in the dictionary file of EMPLOYEE. R/LIST always looks in the dictionary of the file referenced by the second word in the command line. From this starting point, the system can access each and every file in the database.

Commonly used dictionary terms can be stored once in a master dictionary file, and the R/LIST processor will "path" backward to this default file if a referenced term is not found in the primary dictionary specified in the command line.

The SELECT and SSELECT commands are used to create key-list inverts (an indexing file) that can be passed to a later process. A simple command can select all male employees hired after a certain date, assigned to one of three departments, and place the selected list of keys in alphabetical order by department. Once

```
SCR                          PROMPT EDITOR

01  PN          SAMPLE2              19  PART        0
02  FIELD.NM    COMMENTS             20  FIELD.NO   11
03  WIND.SZ                          21  USER1
04  DEPTH                            22  USER2
05  YROW        13                   23  MV.MASTER
06  XCOLM       21                   24  KEY.FLAG
07  FORMAT      L#40                 25  XREF.FLAG
08  OUT.CONV                         26  DISPLAY.XREF
09  WIND.NO
10  FORMULA
11  PROMPT      COMMENTS
12  MASK        ////////////     13  REQ.OPT        0
14  PATRN
15  NULL.DFLT           16  VFILE              17  NOT.VFILE
18  DESC        ENTER ANY COMMENTS ABOUT THE CUSTOMER.

CHANGES?
```

***Revelation*'s Prompt Editor screen designs customized screens.**

created, the list may be saved as a file, then recalled (using the GET-LIST command). Once recalled in this manner, the next R/LIST command will use the invert to control access to the data file. While the command LIST EMPLOYEE will list the entire file, the two-line sequence of GET-LIST MALES (built to select SEX='M') followed by LIST EMPLOYEE will skip over the female portion of the file without having to read those records at all. You can create and store as many lists as you wish. Once built, you may modify a list with the system editor or by a BASIC program. In large file applications, a batch script file can be used to build the list files overnight in preparation for month-end reports and other high-volume report requirements.

Active Lists

The list functions greatly enhance the speed of large file access. Remember that unlike other systems that must scan each record during query and then discard the unwanted ones, an active list is a true invert; it directs access to only the records that are wanted. Once you master the technique, report generation becomes much faster. Query commands may be "catalogued" for future use and given a name. Type the name, and the query runs again without your having to rekey the whole line.

The system also includes the R/BASIC compiler. Combining the high readability of COBOL and structured terseness of FORTRAN, this implementation of BASIC is both easy to learn and highly readable. It has none of the strange notations required by CBASIC or MBASIC; you write using meaningful variable names and statement labels, not numbers. The compiler knows the data type of each variable without being told. Nor do you need an advanced degree to perform file operations. The READ and WRITE commands will do, since the data management software will handle the direct access to records and the locations of individual fields in the variable format records.

Icing on the Cake

R/BASIC can access data files without knowing the format of the records in the file. The file dictionary is available to the BASIC program, allowing indirect reference to fields. The system will determine the relative field location, size, format, justification, and required conversions at the instant that the reference is made to the data. You can completely restructure a file, rearrange the fields, change their sizes, and add new fields to a file without rewriting or recompiling the programs!

In addition to its full command vocabulary (including dynamic arrays and string functions), the R/BASIC EXECUTE and PERFORM commands allow you to invoke any *Revelation* command or any PC-DOS command from within a BASIC program. This unusual ability is an example of some fresh thinking.

R/BASIC allows you to invoke any Revelation or PC-DOS command from within a BASIC program.

Although I found a number of typos, the *Revelation* documentation is neatly packaged, nicely typeset, and filled with examples. The two-volume set is broken up for the nontechnical user (Volume 1), and for the programmer (Volume 2). Several lengthy tutorials, strategically placed in the manuals, are a big help to the first-time user. Each tutorial unit contains step-by-step instructions coupled with pictures of the screen in use and explanations of the process that is underway. Since PICK is different from most other operating systems, the tutorials are a definite plus.

Revelation requires a maximum configuration PC to perform its wonders. The data management software is resource hungry—and the vendor recommends you use at least 512K RAM. The 8087 math coprocessor chip is a requirement. Also, you should recognize that this is a hard disk product, even though it can be run on floppies. The system deals with data files as a series of 64K "frames," and transferring data in that quantity between memory and floppies just doesn't make the grade. You can run *Revelation* on popular PC-clones including the Compaq, Columbia, Corona, and Eagle computers.

Despite all of the memory and the presence of a math chip, parts of the system are relatively slow in operation. Direct access to any record is very quick, but those functions that call for scanning a file serially are not as fast. Any PICK system carries a serious amount of overhead to support the functions that you take for granted after a short while. What you notice is the sorry effect of a 4.7 mHz CPU coupled with a less-than-rapid disk controller. Remember, that simple query you key in may cause simultaneous access to three or four files plus a sorted key list. All that processing is going on behind the screen, and the PC isn't powerful enough to keep up with the demands for resources some of the time.

Switching to another brand of external hard disk can result in a visible increase in speed. Now if someone would just wind up the clock on the CPU. . . .

At $950 a copy, *Revelation* is at the high end of the price range. Couple that with the cost of expanded memory, a math chip, and possibly an external hard disk and you are looking at a sizeable investment before entering the first screen. But *Revelation* is a classic case of "you get what you pay for." It costs a bit more than most, but it gives you the best there is.

I've worked with mainframes and large minicomputers for many years, and, with the arrival of *Revelation*, microcomputers have caught up to the larger systems. Yes sir, industrial strength software for the PC has finally arrived!—**John Phillips**

(continued)

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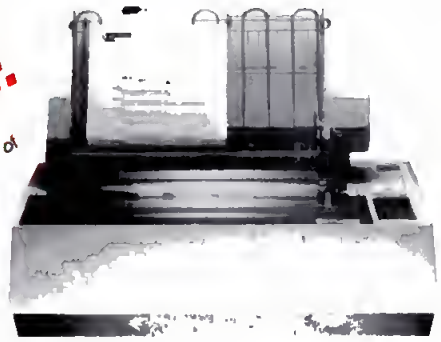

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PROJECT DATA BASE

DataFlex: Programming Gymnastics

DataFlex is a flexible, powerful, and complex applications development system. Its advantage is primarily in the broad spectrum of operating systems and machines it supports—both 8- and 16-bit machines and single and multi-user operating systems.

Its major drawback is its complexity. *DataFlex* is not a program for beginners, but rather a complex and powerful system designed to help professional applications programmers streamline their database operations.

DataFlex was originally written by Data Access Corporation, an applications programming house, for use in its own programming. The package's adaptability to many machines and operating systems is in large part due to the fact that it was written in Digital Research Inc.'s MT+ Pascal language.

At first glance, *DataFlex* seems to be composed of a hodgepodge of approaches to data management and applications programming. However, when you break its features down into their components, *DataFlex* reveals itself to be a rational database management system.

Functionally, *DataFlex* can be divided into two major areas of operation: configuration programming and execution.

In configuration programming operations, you can design applications, define databases, design and configure screens, and design and configure reports, all of which can then be easily used by nonprogrammers.

```
FOR timer FROM 1 to 500
   MOVE timer TO an_integer
LOOP
```

DataFlex's structured control commands include a FOR-FROM-TO-LOOP command that allows for repetition of a task over a specified range.

```
#COMMAND SIGNON
         CLEARSCREEN
         SHOW
         SHOW '       EXAMPLE PROGRAM'
         SHOW ' (C) 1983 DATA ACCESS CORP'
         SHOW
#ENDCOMMAND
```

DataFlex macros can create new commands such as this SIGNON command.

In execution operations, you can enter data, perform file maintenance, direct file processing, order report and form printing, query file data, and manage extensive backup operations.

Data Dictionaries

As with most programs of this class the heart of *DataFlex* is its file-handling routines. Unlike most, *DataFlex* uses data dictionaries to maintain file specifications. Two *DataFlex* utilities, AUTODEF and FILEDEF, maintain these data dictionaries. You use AUTODEF and FILEDEF to paint screens and create file structures and relations. You use AUTODEF for *DataFlex* programs with a single file and FILEDEF for complex, multifile database programs.

Because *DataFlex* uses data dictionaries, when making changes to a database structure, you must save existing data to a file while redefining (and recompiling) the target file structure. Old data can then be read back into the new file.

Similarly, gross file manipulation (for example, deletions of entire files or databases) must be made from within the *DataFlex* environment in order to keep the data dictionary files up to date.

Database searches (and, indeed, database sorts) are based on indexing rather than record manipulation. In 16-bit environments, each data file can have up to nine on-line indexes and one ad hoc index. An index (or key) file can have a single key or multiple keys.

> DataFlex's major drawback is its complexity. It is not a program for beginners.

DataFlex's multikey, on-line ISAM (indexed sequential access method) capability keeps each index of each file current with every record entry or deletion. It maintains in a data dictionary basic file structures along with relational links. A REINDEX utility is available if you want to start over from scratch or recover damaged index files.

A QUERY utility enables you to do quick general lookups and scans within the files of a database. The utility uses menus

DataFlex, Version 2.0
Data Access Corporation
8525 S.W. 129 Terr.
Miami, FL 33156
(305) 238-0012
List Price: $995
Description: Relational
Requires: 100K RAM, 2 disk drives, DOS 1.0.
Records per File: 65,536

CIRCLE 764 ON READER SERVICE CARD

and prompts to define the search parameters. Unlike the query utilities of some database management systems, *DataFlex*'s QUERY utility is relatively simple and does not allow major changes (mass adds and deletes) to files. Instead, operations of that type are handled by *DataFlex*'s highly flexible but also quite complex REPORT utility.

Program logic is controlled by *DataFlex*'s structured programming language, a curious but effective mix of COBOL, BASIC, and Pascal statements.

This control logic includes the commands GOTO, GOSUB, ON, MODE, and IFNOT.

The *DataFlex* programming environment allows up to 32,000 variables, 40 of which can be of the integer type. Each program can have up to 32,000 lines, and a chaining command is available to link multiple program segments.

In a 16-bit environment, each *DataFlex* program can control up to 125 files with at least 10 files open simultaneously.

As is the case with similar applications development systems, a *DataFlex* program controls all input/output, including screen and file management as well as report generation.

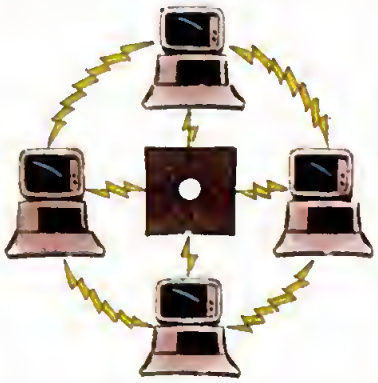
DataFlex source programs can be written on any line editor (a simple line editor is included with the package). The source program is then compiled by the *DataFlex* COMP utility into *DataFlex* pseudo-code. Not only does the compiled *DataFlex* program run faster than it would if interpreted line by line at run-time, but the compiling process, by definition, encrypts the *DataFlex* program, ensuring complete program security.

Macro Flexibility

DataFlex is written in the Pascal language, and all *DataFlex* commands are macros that are kept in a macro library accessible to you. This arrangement means that you can enhance *DataFlex* by rewriting *DataFlex* command macros or by designing your own and adding them to the macro library. You can also link *DataFlex* with your own Pascal routines.

Macro use is important throughout *DataFlex*. You can always write source code to make any operation occur. But this "brute force" is generally not necessary. Not only can you write macros, but most common activities can be invoked using prestored *DataFlex* macros, which saves a great deal of your programming time.

Although *DataFlex* does not directly support any of the standard export formats (DIF, SEG, or the like), its REPORT writing utility is powerful enough to allow you to program output in any format you wish.



DataFlex is ideal for the large company seeking to standardize database management on a variety of machines and operating systems.

Import files must be structured in straight ASCII format before *DataFlex*'s READ utility can handle them.

Obviously screens can be used for input and output. A strong feature is *DataFlex*'s ability to break screens down into images (called pages) that can be used to generate forms with or without data.

With 125 screens permitted per program, 255 characters per field, 255 fields per record, and 65,536 records per file, you will probably never run up against *DataFlex*'s internal limits.

An important feature of the *DataFlex* system is the use of Flex-Keys for routine screen I/O and file management. Basically, *DataFlex* assigns common database management commands to function (and other special) keys. Commands assigned to Flex-Keys can accomplish the following functions: clear screen, delete record, back field, find, help, next record, previous record, save record, "super find," and various user-defined commands. (The "super find" command [SFIND] is a useful feature that searches through successive levels of records.)

These keys all have associated "indicators" that can be used in *DataFlex* program commands to invoke their effects. For example, the SUPERFIND Flex-Key has an associated indicator called "KEY.SFIND" that can be inserted within a program to execute the SFIND command.

Flex-Keys permit you to use common database maintenance commands without the tedium of paging through menus. Because the Flex-Keys always represent the same commands, a program operator can use the same keying routines for all applications designed with *DataFlex*.

These features can reduce programming and training time. In theory, a data entry person working with *DataFlex* programs need only be trained with one set of key assignments. Because all *DataFlex* applications use the same macro keys, there will be no confusion between commands for different applications.

If you do want to create menus, *DataFlex*'s menu development system allows you to create not only complex menu systems for a particular application, but also menu overlays for utility functions that are program independent and can be manipu-

lated to do just about anything you want.

A Supportive Program

As I discussed earlier, one of *DataFlex*'s best features is the wide range of operating systems and processors it supports. Among the microprocessors supported are the 8080, Z-80, 8085, 8086, 8088, and 8186.

The range of operating systems that *DataFlex* supports includes CP/M, CP/M 86, MP/M 86, MS-DOS, PC-DOS, TurboDOS, Novell Sharenet, PC-NET, DMS Hi-net, Molecular N-Star, TeleVideo MmmOST, Action DPC/OS, Omninet, OSM Muse, and IBM PC with a Corvus hard disk.

The package also supports all popular ANSI terminals. In fact, if you use *DataFlex* on the IBM PC with DOS 2.0, you have to set the ANSI.SYS device in the CONFIG file. (When using DOS 1.1, the DOS TERM program is used.)

Obviously, *DataFlex* is designed to operate in a multi-user environment. By "multi-user," *DataFlex*'s designers mean multiple users can write to the same record in the same file simultaneously.

Many multi-user products prevent a record from being read when the record or one of its relatives (a transaction record, for example) is already being accessed by another user. *DataFlex*, on the other hand, allows unlimited read access to the database and then rereads the data when an operator saves a changed record. The record or system is locked only during the SAVE operation itself.

You can, however, elect to use the LOCK command, which will prevent other users from accessing the record while you are processing. This enables you to finish updates to the database before other users post transactions.

DataFlex is a solid product, ideal for the large company seeking to standardize database management on a variety of machines and operating systems or for the professional applications developer.

—Richard N. Aarons

PC/FOCUS: The Price of Power

```
>>EX MYSET
:,
C G3PERSON FOC      ON 06/11/84 AT 13 32 02
(FOC428)TRANS    366 REJECTED  FORMAT  COL     85 FLD ZIP
George      Deacon          .459406917 - 11th Ave                Brooklyn
  NY11228
(FOC428)TRANS    383 REJECTED  FORMAT  COL     85 FLD ZIP
Marjorie    Detrich         147130218 Frontenac Rd               Marquette Mte
  IL61554

TRANSACTIONS  TOTAL=    500  ACCEPTED=    498  REJECTED=      2
SEGMENTS      INPUT=    498  UPDATED =      0  DELETED =      0
>>
```

A procedure, MYSET, was written with *PC/FOCUS* to find and print rejected records and to print record counts.

PC/FOCUS is a database management system adapted from mainframes that has just about everything: it maintains huge records (250 fields, 4,096 characters) in files that are limited only by the capacity of your disk drives; it has a very powerful menu-driven report generator; it has built-in graphics, statistics, and communications (both asynchronous and 3270) capabilities; it has an easy-to-use menu-driven procedure to create simple relational and hierarchical files; yet it has the power to design much more complex files. Furthermore, *PC/FOCUS* is based on a powerful procedural language that contains a built-in editor *(TED)*, and it can write files out in DIF or Lotus' .PRN formats.

So where's the catch? It's the "price" you have to pay for all these features. By price, we mean more than the $1,595 cost of the system. To use *PC/FOCUS*, a 512K system with a 10-megabyte hard disk is required. The developer of the software, Information Builders, Inc., claims a 5-megabyte disk is enough, but we feel that 10 megabytes is necessary for meaningful work. While this configuration is certainly expensive, it's still not the most significant portion of *PC/FOCUS*' cost. The heaviest expenditure required by *PC/FOCUS* is the time that must be committed to become proficient with the system. To get your money's worth, you must have some understanding of database management theory, not to mention knowing the concepts behind stored programs and computers in general.

Harnessing the raw power of this system can turn out to be real work. Statements in the documentation such as "This option is analogous to the CMS and TSO syntax of DISP MOD to determine the disposition of the file's record" make it perfectly clear that *PC/FOCUS* is not for the uninitiated. Acquiring the understanding demanded by this program is time-consuming and requires a remarkable degree of dedication.

PC/FOCUS
Information Builders, Inc.
1250 Broadway
New York, NY 10001
(212) 736-4433
List Price: $1,595
Description: Hierarchical
Requires: 512K RAM, 5-megabyte hard disk (10-megabyte hard disk recommended), DOS 2.0.
Records per File: Limited by disk space.

CIRCLE 756 ON READER SERVICE CARD

A Mainframe Transplant

FOCUS, in its mainframe implementation, is a system comparable in power and magnitude to the well-known ADABAS, IMS, and IDMS database systems. Its implementation on the PC has not significantly degraded its quality, but the process has imposed some quantity limitations that were not present on the parent product. For example, *PC/FOCUS* has a maximum of 250 fields per record while there is

no limit on the number of fields in *FOCUS*. The maximum record size in *PC/FOCUS* is 4,096 bytes; in *FOCUS* it is 12,288. Despite these limitations, though, the power and functionality that has been put into this system, which comes on 11 floppy diskettes, is quite extraordinary.

To get a sense of how the system works, we converted three existing disk files to *PC/FOCUS* format and performed various activities with the files. A look at these activities shows some of the complexity and power of *PC/FOCUS*.

The first thing we did was define the *PC/FOCUS* files to be processed by the system. We accomplished this in two ways. First, we used *TED*, the system's built-in editor, to create a Data Dictionary file. This works quite satisfactorily. Any other editor (such as *EDIX* or the IBM *Personal Editor*) that writes standard DOS text files may also be used.

Questions and Answers

As an alternative, we attempted to generate the Data Dictionary file using the built-in FILETALK utility, which works through an interactive series of questions and answers. Using this method, we generated a Data Directory for the file that we named G3PERSON.

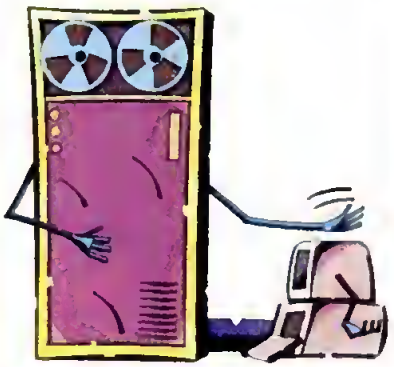
The next step was the generation of a *PC/FOCUS* procedure file (called FOCEXEC files) to automatically read the data on the non-*FOCUS* file G3PERSON.SDF and use it to update the new *PC/FOCUS* file. The file, which must have the suffix FEX, may be developed using *TED* or any other DOS editor and will contain the *PC/FOCUS* commands necessary to define the external non-*FOCUS* file and to properly update the new file. We wrote a series of commands to perform this task. We stored the commands in the MYSET.FEX file and executed them using the *PC/FOCUS* command EX MYSET. The result of the conversion indicated that two records were rejected due to duplicate employee numbers. A file status, obtained by using the ?FILE G3PERSON command, indicates the size of the file and gives pertinent update data.

We produced a report of all employees in last-name sequence with the built-in TABLETALK utility. This utility is similar to the FILETALK utility in that it uses a series of questions and answers to generate the *PC/FOCUS* commands necessary to produce the desired report.

We then decided to perform a quick analysis of employee distribution by state. This was accomplished very rapidly by entering a four-line TABLE command.

Finally, we set up a procedure that selected from the file all employees from a specific state (specified by the user in response to a screen prompt) and performed an analysis of distribution by city. A set of commands was stored in the TSELECT.FEX file to produce a screen prompt and report.

We also ran through many more tests, including file joining (not a difficult task in *PC/FOCUS*) and generating various sorts, selections, and reports. In every case, we followed procedures similar to the examples described above. The system performs tasks very rapidly and it can support the 8087 math coprocessor.



The experience of using PC/FOCUS is both liberating and intimidating.

The Experience

The experience of using *PC/FOCUS* is both liberating and intimidating. The documentation consists of two books containing well over 1,000 pages. The larger of the books, *PC/FOCUS Users Manual*, has a 64-page index and an Appendix of Error Messages that is 30 pages long—in very small print. Users with a data processing background or extensive experience on other software systems featuring user command language capability, such as *dBASE II*, should be able to overcome this intimidation factor, however. And it's worth it, because outlasting the intimidation opens up power and flexibility not usually associated with a database management system. For example, *PC/FOCUS* can turn reports into graphics using the GRAPH command. In addition, a full Financial Modeling Language is built into *PC/FOCUS*. The Statistics section can perform all of the standard statistical functions, including cross tabulations and various types of regressions. Users can also design a macro language (called a "User Structured Language" in the documentation) with the LET command.

Value

The value of *PC/FOCUS* is directly related to the complexity of the tasks you have planned for it. Thus, the question of whether the system is worth its "price" depends on the degree of your familiarity with mainframe *FOCUS*, the depth of your experience with application development on micros, and the extent of your database management needs. For individuals with the proper combinations of skills and requirements, *PC/FOCUS* could be a wise choice. On the other hand, it would obviously be a waste of effort to go to the trouble to learn *PC/FOCUS* from scratch just to use it as a mailing list manager.

—Barbara E. and John F. McMullen

(continued)

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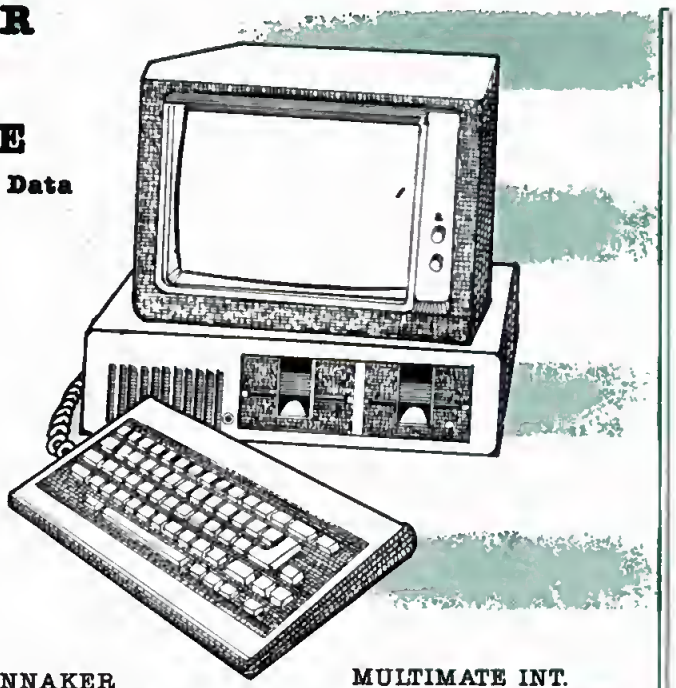

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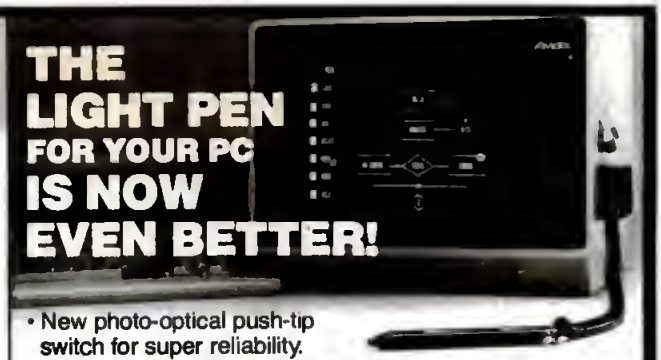

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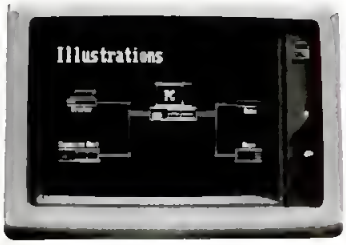

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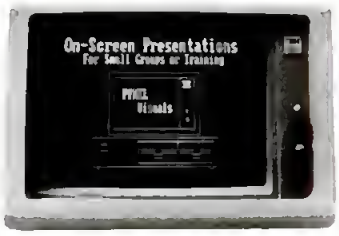

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CIRCLE 223 ON READER SERVICE CARD

PROJECT DATA BASE

informix: Startling Power

Informix is a startling product. It is not another *dBASE II* lookalike; it is big, powerful, and amazingly fast. It is also easy to use.

The *informix* system has been around for a while, as you can tell from its version number, 3.11. Over 10,000 copies have been licensed by Relational Database Systems (RDS) since its introduction in early 1981. The system is written in C and was originally developed for the UNIX world. It is available on a large number of CPUs running UNIX, XENIX, and other similar operating systems and has now been ported over to the PC.

Therefore, although *informix* is new to the PC, it is thoroughly matured and debugged. Don't let the lack of a typeset manual mislead you. *informix* is solid as a rock, faster than a speeding bullet, and even leaps over tall buildings on occasion. Officials at RDS tell me that the documentation is being upgraded and that the system is being repackaged for the PC marketplace. I have seen a sample of the new materials, and they are quite nice. In the meantime, Version 3.11 is delivered with a UNIX-based looseleaf manual and an insert explaining the differences between what you see in the manual and what you get. What you get is great, and you can live with those few items that have been altered or deleted in the PC version. Most deletions reflect the single-user PC environment, while the rest result from differences between UNIX and MS-DOS.

informix, Version 3.11
Relational Database Systems, Inc.
2471 E. Bayshore Rd. #600
Palo Alto, CA 94303
(415) 424-1300
List Price: $795
Description: Relational
Requires: 256K RAM, hard disk, DOS 2.0.
Records per File: Limited by disk space

CIRCLE 760 ON READER SERVICE CARD

```
alias cst = customer;
print customer where salary + cst.salary > 40000
joining co_app = cst.cust_num;
```

In *informix*'s INFORMER query language, the programmer can use arithmetic expressions, do joins on the fly, and print the results.

```
% cat itemrep2

database stores end

define
  param[1] selectitem type character length 20
  param[2] selectquantity type integer
end

read
  into x
  all of orders
  where item = selectitem
    and quantity > selectquantity
end

format every record end

% acego -q itemrep2 File 2


oname           item            quantity

Hart, W.        File                 3
Court, S.       File                 5
```

Parameters param [1] and param [2] are defined in this example of *informix*'s ACE relational report writer program, then specified as 'File' and '2', respectively, on the command line '% acego' at run time. This narrows the selection to those records with an item equal to 'File' and a quantity greater than 2.

I have worked quite extensively with *informix* on the Altos 586/XENIX multiuser system, which has large files, lots of indexes, many users, and many screens. It was amazing to load up the PC disks (three of them) and see the exact same system appear on my screen. What is really impressive is the speed with which *informix* moves through the database. The Altos system I use is clocked at 10 mHz, almost 2.5 times the speed of an XT. While the DOS version of *informix* is slower in execution than the Altos/XENIX one, the difference on my sample files is not that great. (RDS supplies benchmark times on files of 20,000 records.) As long as you work within the framework of functions addressed by the system, you will be pleased from the first minute with the ease of starting up *informix* and its speed in execution. The product does need improvement in a few areas, but I'd like to look first at its overall structure. *informix* comes in pieces; you use each piece to perform one function, which helps to keep you going in the right direction.

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5. Do you have any *MAINFRAME* computers or *MINICOMPUTERS* on site at this location?

☐ Yes (If yes, please report accurately below for the two largest.)
☐ No

Manufacturer	Model	Quantity

IBM or Compatible Personal (Micro) Computer Information for this location:

(Please report accurately for each model indicated)

Manufacturer's Name, Model	6. Currently Owned (Quantity)	7. Plan To Purchase Within 0-12 Months (Quantity)	13-24 Months (Quantity)	25-36 Months (Quantity)
IBM PC				
IBM PC XT				
IBM XT/370				
IBM PC/3270				
IBM PCjr				
IBM Compatibles (Compaq, Eagle, etc.)				
Other (Not IBM or Compatibles)				

7a. In which of the following ways are you yourself involved with the *Personal (Micro) Computers* at your location?

- ☐ A Use them
- ☐ B. Recommend them
- ☐ C Establish specifications
- ☐ D. Approve purchase
- ☐ E Acquire them
- ☐ F Other Involvement (specify) _____
- ☐ G No involvement

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- ☐ 1 For internal use
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- ☐ 3 Other (please specify) _____

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- ☐ A Direct from manufacturer
- ☐ B Manufacturers representative
- ☐ C. Distributor
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- ☐ E System house
- ☐ F In-house (company) store
- ☐ Z Other (please specify) _____

9. Please indicate below the communications capability for which these *Personal (Micro) Computers* are used.

- ☐ A Communicate with remote timeshering or database
- ☐ B Communicate with internal mainframe or minicomputer
- ☐ C. Used in local area network
- ☐ D Down loed data from mainframe or remote service
- ☐ E None of the above

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- ☐ 1 Accounting
  - ☐ A. Accounts Payable
  - ☐ B Accounts Receivable
  - ☐ C Billing & Collection
  - ☐ D General Ledger
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  - ☐ F Order Entry & Invoicing
  - ☐ G Time Billing
- ☐ 2 Communications
- ☐ 3. Data Base Management
- ☐ 4 Date Input/Analysis
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- ☐ 6 Electronic Mail
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- ☐ 10 Personal Time Management
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- ☐ 12 Programming
- ☐ 13 Project Management
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- ☐ 16 Statistical Analysis
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- ☐ 18 Word Processing
- ☐ 19 Other _____

10. Do you help acquire, recommend, specify or approve any of the products or services below?

☐ Yes (If yes, please check all that apply)
☐ No

Computers
- ☐ 1 Mainframe
- ☐ 2 Minicomputer
- ☐ 3 Personal (Micro)

Peripheral Equipment
- ☐ 7 Latter Quality Printer
- ☐ 8 Graphics Printer
- ☐ 9 High Speed Printer
- ☐ 10. Color Monitor
- ☐ 11. Monochrome Displays
- ☐ 12 Modems
- ☐ 13 Hard Disk
- ☐ 14 Tape Backup System
- ☐ 15 CPU Compatibility Card
- ☐ 16 Memory Board
- ☐ 17 Communicetions Port
- ☐ 18 Plotters/Charting Devices
- ☐ 19 Local Area Networks

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- ☐ 25 Time Billing
- ☐ 26 Financial Planners/Spreadsheet
- ☐ 27 Project Managers
- ☐ 28. Word Processors
- ☐ 29 Compilers
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- ☐ 31 Program Developers/Generator Tools
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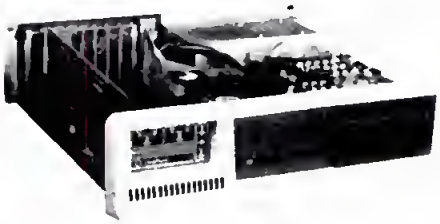

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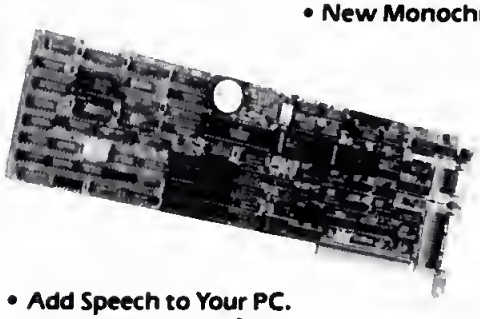

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CIRCLE 224 ON READER SERVICE CARD

DBBUILD

The basic piece is the DBBUILD module, which creates the database files and the database schema (sort of a composite, multifile data dictionary). The DBBUILD module, like most of the other pieces, is a compiler. (This system leaves no doubt that compiled code is faster.) Unlike some other products in this survey, *informix* deals with one database at a time. Within that universe, all data element names must be unique, and the field reference in your code does not specify a file (since the tag is unique in the database).

The input to DBBUILD's compilation is a text file that you enter with a simple line editor or your favorite word processor. Following the PC test format, I created a database called PERSONNL, starting with an employee file. If you were using this database, you would build a description text file (for each file in your database) containing the name of the database, the name of the file, and the field descriptions.

Handing this text file to DBBUILD will create the PERSONNL database and incorporate your definitions as the first file within that database. With string data, you must specify a length attribute. With the other ten or so data types, the length is implicit. The file specification describes a primary index key field of employee number followed by a bunch of character fields. B-tree index files will be built and maintained for the index key and also for the last name, state, and zip code fields. For the three secondary keys, duplicates are allowed (they are not permitted for the primary key).

You type in this text file, then issue the command DBBUILD (textname). What you get a few seconds later is the database file (PERSONNL.DBD) and the employee files (EMPLOYEE.DAT and EMPLOYEE.IDX). Just repeat the process for the other files in the database, and each will be added to the structure as it is compiled by the DBBUILD module. Like everything else in *informix*, the compiler is fast.

In this example, you will notice that the data dictionary does not contain much control information. The dictionary is little more than a map of the field list for each file. Fields may be specified as character, integer, long, float, double, serial, date (three kinds), money, or composite. You may also indicate that a field is to be indexed by the system (you can't join it if it isn't indexed). Some indexes may restrict entry to nonduplicated data, whereas others can allow multiple occurrences of the key data. All of the control information normally found in a complete data dictionary is located in the screen generator package that includes the FORMBUILD and PERFORM modules.

While this approach violates the accepted standards for database design, it does have its advantages. It is easier to get differing database views since you can control the format and entry rules when designing the screen. A good systems designer will not allow this feature to get in the way—an inexperienced programmer might.

Once you have compiled a database with DBBUILD, you could immediately invoke the fixed-screen entry processor, ENTER2. (ENTER1 for line input terminals was not ported to the PC.) Calling up ENTER2 produces the same type of display as does the EDIT/APPEND command in *dBASE II*. It's not terribly exciting, but you can key in some records.

PERFORM

The fun starts when you start using the *informix* transaction processor, called PERFORM. The compiler front-end of this module is FORMBUILD, which must be run before PERFORM will strut its stuff. It is another two-step process, similar to that of the DBBUILD modules. First you use an editor to enter a set of screen definitions, then compile them with the FORMBUILD program. Once it is compiled (just a few seconds is all it takes), the resultant file can be executed by PERFORM.

This approach is straightforward, but it is also more tedious than that of some other systems for two reasons. First, it is not like interactive "screen painting" with the cursor. You use an editor or word processor and lay out the screen as a series of lines, one at a time. If you are not using a full-screen editor, you will end up practicing your four-letter-word vocabulary. Second, all of the specifications for field edits, display formatting, required fields, optional fields, default values, range tests, value lists, and so on are stored in the compiled screen, which means you have to key it in right there. (And you will have to rekey it if you build other screens using the same fields later.)

(continued)

You use an editor or word processor and lay out the screen as a series of lines, one at a time. If you are not using a full-screen editor, you will end up practicing your four-letter-word vocabulary.

Building a text file for FORMBUILD isn't difficult, and the examples found in the manual are excellent. The text file contains a database header line, a screen layout section, attributes definitions and rules, and master/detail file instructions (optional).

The first section simply names the database to be used. Then you present a picture of the screen, entering literal text and calling for database fields by a tag code. Following the screen layout, you list all of the tags that you used and insert the actual field name from the database schema, the edit rules, display formatting, and so on. In advanced, multifile screens you may add a final section that establishes (for this form only) the master/detail relations between multiple files. Sound easy? As a matter of fact, it is.

I don't have space to discuss all of the variations possible on an *informix* PERFORM screen. But you can work with elements from multiple files, perform composite joins on multipart keys, copy elements from one file to another without rekeying the data, and page through the detail records related to a single master record. When you remember that you are working totally within a packaged system without doing any programming, you can begin to appreciate what I mean when I say *informix* has real power.

The critical phrase in the last sentence is "without doing any programming." The product's capability to manipulate and display information without recourse to a traditional programming language is hard to imagine until you have seen it.

INFORM

The remaining pieces of the system handle queries, formal reporting, and language interfaces. The query function comes under the INFORM module, which incorporates a nonprocedural language that is relationally complete in every respect. You can select, sort, join, summarize, update, add, and delete at will. If that isn't enough, you may also create temporary files, perform mass (class) updates, execute script files created with an editor, request on-line help, and unload sections of the database. Its major drawback is that joining is limited to two files that must produce a third, temporary file.

The *informix* manual has a 50-page section on the use of the INFORM module. Included are enlightening examples of both simple and complex queries (based as always on the sample databases included with the system).

> The program can manipulate and display information without recourse to a traditional programming language—a feature you might find hard to imagine until you actually have seen it.

A module called ACE handles formal reporting. I don't know where it got its name, but ACE is truly at the top of the heap of packaged report generators. Its documentation is over 160 pages long—one-third of the system manual. The authors have gone to considerable length to explain the features and capabilities of this potent module. ACE is as close as *informix* comes to a useable language. It can handle the normal range of select, sort, and display functions, but then goes far beyond that first plateau by offering IF-THEN-ELSE branch logic, combined ascend and descend sorting, detailed numeric and string formatting, complex headings and control break logic, FOR looping, and access to C subroutines for whatever functions you can't otherwise accomplish directly.

Like all the other modules I have described, ACE works in two steps. ACEPREP compiles your text file describing the report to be produced, and ACEGO runs the compiled code to produce the desired output. The ACEPREP compiler creates a file with an .ARC extension and the same name as the text file that you have already fed to it.

Conclusion

The *informix* system is great, but it isn't perfect. It needs work in several areas before it can move to the top of my list.

The program's most serious deficiency is its lack of a procedural language of a caliber that matches the rest of the system. If it is revised to include one, *informix* will move into the finals of the competition. To force a reliance on C as the only language support is less than the best solution. The C library that comes with the system is complete and well thought out. But in spite of the growing pressure from Bell Labs, how many people do you know that are competent in C?

My other gripe is with *informix*'s handling of system diagnostics. Each module is crisp and quick to display a carefully numbered error message when something in your input is invalid. You might see something on your screen like "6020—there is no current record" and turn to that large manual for help. When you locate diagnostic message number 6020, what you find is this: "There is no current record." Not very helpful! A system as complex (internally) as *informix* should help you discover what you did wrong and tell you how to fix it. In virtually every case the data in the manual are an exact duplicate of the terse one-liner mocking you from the bottom of the screen.

Once those two flaws are fixed, you'll have the world at your fingertips.

—John Phillips

KnowledgeMan: The Professional's Tool

```
IF CURREC (SAL) = 0 THEN
   OUTPUT "No salary records."
   BYE
ELSE
   OBTAIN FIRST RECORD
   WHILE #FOUND DO
      IF EMPNO = TMPEMPNO THEN DO
                  LET TMPSAL = SALARY
                  OBTAIN PRIOR
                  LET CHNG = SALARY-TMPSAL
                  LET INCREASE =((SALARY/TMPSAL)-1)*100
                  OBTAIN NEXT
      ELSE
                  LET TMPEMPNO = EMPNO
                  LET CHNG = 0
                  LET INCREASE = 0
      ENDIF
      IF EOT (SAL) THEN BREAK
      ENDIF
      OBTAIN NEXT
 ENDWHILE
ENDIF
```

A portion of a *KnowledgeMan* procedure showing nested IF's.

KnowledgeMan (short for *KnowledgeManager*) is a sophisticated micro-based database manager from MDBS, a company long associated with fine minicomputer-based software.

Perhaps the best description of *KnowledgeMan* is that it is a complete programming environment with emphasis on data management or, more simply, a sophisticated applications development system.

KnowledgeMan operations include data management, ad hoc inquiries, spreadsheet analysis, statistical analysis, screen I/O, forms management, printed forms management, procedures, and functions.

The *KnowledgeMan* programming environment includes a Pascal-like structured programming language, a sophisticated macro facility, a powerful, easy-to-learn query language (a superset of IBM's SQL/DS), an optional screen-painting utility, and an optional business graphics utility.

Also, the *KnowledgeMan* programming environment includes an integrated 255 × 255 cell spreadsheet, internal control functions, math, string, and logic functions, and memory (virtual) variables limited in type and number only by available memory.

KnowledgeMan
Micro Data Base Systems, Inc. (MDBS)
P.O. Box 248
Lafayette, IN 47902
(317) 463-2581
List Price: $500
Description: Relational
Requires: 192K RAM, 1 disk drive, DOS 2.0, hard disk recommended.
Records per File: 65,535

CIRCLE 766 ON READER SERVICE CARD

Hardware Limits Only

One of *KnowledgeMan*'s strong points is that fields, records, files, and variables are virtually without limits in the program.

It can handle 65,535 records per table (data file), 65,535 characters per record, 255 fields per record, and 65,534 characters per field. It does not limit the number of data files that can be open simultaneously, the number of control breaks, command line length, index keys per table, fields per index key, or working (memory) variables.

In short, the only limits on *KnowledgeMan* are those of the hardware on which it runs.

The *KnowledgeMan* system comes on two double-sided, double-density disks with the root program, 20 or so overlays, and five utilities—in all, over 400 kilobytes of software.

Through the use of overlay files, *KnowledgeMan* can be run under PC-DOS with at least 192K RAM and 500K of mass storage—a single drive, in fact, if it can handle 500K.

Each of the overlay files contains a sub-

Fields, files, and records are virtually without limits in KMan.

set of *KnowledgeMan* commands and features so you need only have on line those overlay files that you will use in the current session. *KnowledgeMan* is not copy protected so the floppy disk user can create various applications disks—say, one for screen I/O, another for program development, and a third for spreadsheet applications.

On the other hand, if you have 400K of RAM and a hard disk, you can simply put all of the overlays on disk or use a utility called MOMAN that links all or a subset of the overlays into a single .EXE file.

The heart of the *KnowledgeMan* system is its database manipulation capability. *KnowledgeMan* databases comprise tables (files) that contain records that in turn contain fields, the smallest addressable data element. Each of the fields in an active (open) data file can be addressed as a variable.

For example, suppose two data files are open—say, personnel and department—each of which contains records with one field identified as EMPNO, for employee number.

You could use the following commands:

```
SELECT DEPARTMENT.DEPTNAME
FOR DEPARTMENT.EMPNO =
PERSONNEL.EMPNO, ORDER BY AZ
PERSONNEL.LNAME.

LET LASTNAME =
PERSONNEL.LNAME
```

As you can see, *KnowledgeMan* uses an English-like syntax in its query language. Field variables are identified by field name preceded by filename and a dot. Thus DEPARTMENT.EMPNO represents the value for employee number in the current record of the table (data file) department.

Linking on the Fly

These commands operate on two files simultaneously, selecting a department name based on a link between the EMPNO fields in both data files.

An important point to understand about *KnowledgeMan* is that the link, or pointer, between the two EMPNO fields in the example above is created by the SELECT command and disappears as soon as the statement is executed.

> The only limits on KnowledgeMan are those of the hardware on which it runs.

In short, all *KnowledgeMan* relational links are created "on the fly."

Notice also in the example that the virtual (memory) variable LASTNAME receives the string value from the field variable PERSONNEL.LNAME. *KnowledgeMan* automatically decides on the variable type by the data it contains. In this case LASTNAME becomes a string variable with the assignment. If we later use the statement

```
LET LASTNAME = 5
```

the variable type of LASTNAME would become integer.

As seen above, database queries can be made on the fly with *KnowledgeMan*'s query language (SQL/DS) or via procedures (programs) constructed with *KnowledgeMan*'s PASCAL-like procedural language.

KnowledgeMan's procedure language uses structured control routines such as IF-THEN-ELSE, WHILE-DO, and CASE.

Additionally, any of the SDL/DS statements can be used within a *KnowledgeMan* program.

The *KnowledgeMan* environment includes an integrated spreadsheet, the cells of which represent variables that can be used in the same way as memory or field variables.

Conversely, a spreadsheet field can express a constant, variable, expression, or even the result of a complete program stored on line.

KnowledgeMan permits extensive data security with different security codes; 65,792 possible combinations are available for different users right down to the field level. Therefore, programming can provide users with logs down to the field level. Encryption utilities are provided to encrypt program source code and data files, which further enhances security.

The program also permits extensive use of color for screens and spreadsheets. Video attributes (color, inverse, bright, blinking, and so forth) can be used in prompting and can be changed depending on the values of data entered or computed. When used with a financial planning spreadsheet, for example, the "bottom line" field might stay green when the value represents a solid profit, turn yellow if the value approaches break-even within 5 percent and turn red when the value becomes less than 5 percent under the break-even point.

I/O screens can be programmed or painted. The KPaint utility enables the user to type onto the screen exactly what should appear there and assign colors to fields and prompts using menu driven commands. Thus, the screen created can be stored in a program file or in binary format for immediate use.

KGraph is a sophisticated business graphing utility that can generate all classes of business graphs and many types of engineering curves. The screen can be divided into sections to show more than one graph at a time.

This multi-window graph format is especially helpful when playing "what-if" in the spreadsheet mode. Graphs can be set side by side or even overlaid to show the results of successive calculations.

KnowledgeMan is a professional's tool. It is highly flexible, but the price of that flexibility is complexity.

The professional approach is duplicated in the documentation. It is excellent,

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but it assumes that you are familiar with database structures, spreadsheet analysis, and structured programming concepts.

In order not to scare off beginners, I should point out that MDBS does have a 300-page beginner's tutorial in the works, and a draft copy looked pretty good. MDBS also conducts 2-day training seminars on a regular basis in major cities. The $300 course is a must for the professional who is going to use *KnowledgeMan* in numerous applications.

KnowledgeMan basics—defining tables, adding or editing data, and using the query language—are all easily mastered. It is only when you want to take full advantage of the program's power that you need special experience or training.

The ideal application for *KnowledgeMan*, I believe, will be for those who must maintain many different databases, each with its own special I/O routines and security challenges.

MDBS user support is excellent. *KnowledgeMan* has undergone six version changes since it was first released in May 1983. Updates have been provided quickly and without charge to the user. The company is responsive to user input; many of the updates incorporated "nice-to-have" features suggested by users rather than simply fixed up bugs.

KnowledgeMan is highly flexible, but the price of that is complexity.

All software involves compromise. The more a particular product attempts to do, the more complex it becomes. *KnowledgeMan* attempts to provide mini power to the micro world and it does a pretty decent job. As a professional's tool, it is among the best applications development products on the market.

—Richard N. Aarons

dBASE III: Advancing the Standard

The specter of *dBASE II* has haunted Project: Database since the project's inception. As the dominant database manager for the PC and one of the best-selling programs on the market, *dBASE II* has served as the unstated standard by which all the competitive products have been evaluated. Even though *PC*'s editors asked Project: Database authors to consider each product on its own merits, it has been difficult to disregard such a de facto standard.

It is perhaps fitting that an entirely new member of the *dBASE* family has appeared just as Project: Database draws to a close. *dBASE II* has justly been criticized for its almost total correspondence to earlier 8-bit CP/M versions. Although compatibility and consistency are strong arguments for keeping 8- and 16-bit versions essentially identical, owners of 16-bit machines have complained that *dBASE II* does not take advantage of the power that their advanced hardware offers.

In response, Ashton-Tate has finally announced *dBASE III*, a new product designed only for 16-bit and larger machines. Of course, several other factors undoubtedly motivated this development. Project: Database is indicative of how competitive the database management field has become, and a new version of *dBASE II* was required to match the plethora of new products nipping at its heels. *dBASE II* was written in assembly language, so it was specific to the 8080/Z-80 and 8086/8088 microcomputer families. *dBASE III* is written in C, so its portability is greatly enhanced. Ashton-Tate will thus be able to offer *dBASE III* for UNIX, CP/M-86, CP/M-68K, and other current and future operating systems and microprocessors.

PC obtained a beta test version of *dBASE III* for evaluation. *PC* does not usually review prerelease software, but the obvious benefits of including *dBASE III* in Project: Database convinced the editors to make an exception. The length restrictions of Project: Database reviews prohibit a discussion of all the aspects of *dBASE III*, so a much more detailed examination will appear in a future issue of *PC*. Some readers would no doubt appreciate a detailed comparison between *dBASE II* and *dBASE III* to determine whether upgrading to the new product is worthwhile, while others might want to examine *dBASE III* without reference to its predecessor. I'll try to do a little of both here.

dBASE III
Ashton-Tate
10150 W. Jefferson Blvd.
Culver City, CA 90230
(213) 204-5570
List Price: $695
Description: Relational
Requires: 256K RAM, 2 disk drives or 1 drive and a hard disk, DOS 2.0.
Records per File: Limited only by disk space.

CIRCLE 758 ON READER SERVICE CARD

Starting dBASE III

dBASE III is copy-protected with the Prolok disk system. This will be annoying to hard disk owners, since the original distribution disk must be kept in a floppy drive when the program is first started. Ashton-Tate has not used copy protection

```
. SELECT 1
. USE deptsort
. SELECT 2
. USE person INDEX pemplnum
. SELECT 3
. USE salary INDEX semplnum
.
. SELECT 1
. SET RELATION TO empl_num INTO person
. SELECT 2
. SET RELATION TO empl_num INTO salary
.
. SELECT 1
. LIST dept_num, empl_num, person->l_name, salary->cur_sal OFF
```

This series of *dBASE III* commands is used to select three of a maximum of ten database areas and then open the three personnel files. The new SET RELATION TO command links the files by employee number. The LIST command specifies which fields from the three files are to be displayed.

previously, but one can hardly blame the company for wanting to protect its major development investment in the new product. Prolok works well, but can't somebody think of a way to avoid having to load a floppy?

On a more positive note, *dBASE III* looks for a file named CONFIG.DB when it starts up. Like the CONFIG.SYS file that DOS looks for at boot time, this text file contains single-line entries that can modify the default configuration used by *dBASE III*. A long list of attributes can be modified, including default drives, paths for searching for data files, use of an external word processor or text editor in lieu of *dBASE III*'s built-in editor, and so on.

Creating a Database

The normal *dBASE II* and *III* interface requires you to issue commands when presented with a period (.) screen prompt. The CREATE command starts the definition process, during which you specify a name, type, and length for each desired field. *dBASE III* has character, numeric, logical, date, and memo fields, the last two of which are new to *dBASE III*. Numeric fields use a new IEEE format for up to 19 digits of floating-point precision and 8087 compatibility (the current release does not support the 8087 math coprocessor, but the hooks are there for its future use). Date fields store dates in a normal MM/DD/YY format, and several new functions have been added to manipulate date data. Memo fields are extremely long text fields that can hold up to 4,000 characters if the *dBASE III* editor is used to create them, or up to 512 kilobytes if created by an external word processor. Memo fields are stored in separate disk files and do not take up space in the main .DBF data file, where a 10-character "placeholder" field indicates the existence of a memo field in an external file.

> dBASE III has character, numeric, logical, date, and memo fields, the last two of which are new.

The CREATE process uses the full display screen and has been enhanced in *dBASE III* to use IBM graphics characters and more detailed prompting messages. An optional menu explains the use of the various editing and cursor keys; either the special keys available on an IBM PC or the old-style control characters can be used. Other enhancements include recaps of the number of fields defined, an indication of bytes remaining from the newly increased total record length restriction of 4,000, and so on.

Entering and Editing Data

Entering and editing data also use enhanced full-screen displays. The APPEND and EDIT commands are used for normal operations to add or edit one record at a time. The BROWSE command can also be used for either editing a screenful of data from many records or to add new records. New *dBASE III* enhancements to the BROWSE command allow locking fields in place so that long records can be edited more easily, much like locking titles in a spreadsheet. You can also specify fields that you want to browse through. A modified full-screen CHANGE command adds interactive changing of specified fields to *dBASE II*'s bulk modifications of the values of all the records in a field. A new UPDATE command uses data from a file to make changes to an active data file, useful for batch modifications to existing data.

Help

dBASE III includes detailed Help screens called with the HELP command. If nothing follows HELP, a menu-driven HELP utility is called, which makes it easy to find the Help screen for the command desired. Alternatively, typing HELP BROWSE, for example, immediately displays help for the BROWSE command. The Help screens show the exact syntax required, the options available, and a brief description of how to use the command. They are much like the on-line manuals that come with UNIX and are extremely helpful, especially to remind experienced users how to employ the less frequently used commands.

Bigger news is the new ASSIST system. ASSIST is a completely menu-driven system that walks first-time users through most *dBASE III* commands. It is not merely help or a tutorial; ASSIST actually does things and executes the commands. The idea is to allow new *dBASE III* users to obtain most of the benefits of the system

without having to learn the myriad of *dBASE III* commands.

The screens are beautifully laid out and are easy to use. Simple explanations of each available command are provided. A rank beginner who had not even opened the manual might still have problems creating a complete database system and inputting and accessing data, but ASSIST is both a major aid to using *dBASE III* and a valuable learning tool.

ASSIST is a completely menu-driven system that walks first-time users through most dBASE III commands.

Retrieving Data

Traditional *dBASE II* commands such as LIST and DISPLAY can be used to output data to the screen in *dBASE III* or, with a new TO PRINT clause, to a printer. Fieldname headings may precede the listings of the fields. Various modifying clauses, such as WHERE and FOR, can be used to restrict the records displayed.

The *dBASE II* REPORT command, widely regarded as simplistic and limited, has been enhanced in *dBASE III*. A multiscreen input procedure allows you to define a more sophisticated output report than was possible before, including fields from multiple files, better aggregates, and other improvements. REPORT is still not particularly sophisticated as report generators go, but it is certainly easier to use.

Another new command creates mailing labels. LABEL uses two input screens to specify the physical characteristics of the labels to be used, including two-, three-, or four-across, various spacing options, and what fields should appear where on the labels. Printing the labels is as easy as issuing the LABEL FORM command. The program handles labels with different numbers of lines automatically. Since programming this function in the *dBASE II* language was not an easy task, LABEL is a nice addition to *dBASE III*'s arsenal.

The dBASE III Language

In spite of the new capabilities of REPORT and LABEL, many reports will still have to be created with *dBASE III*'s high-level language. Programmers have long debated whether *dBASE II* really has a language per se or merely files with command sequences. Most users recognize *dBASE II*'s power as a language, and the new commands and functions included with *dBASE III* will strengthen that perception.

Among other additions, *dBASE III* allows up to ten files to be open at one time rather than only two. The SELECT command can now use up to ten workspaces for data files, and *dBASE II*'s requirement that they be designated as primary and secondary has been eliminated. The USE statement also sets the name of the data file as an "alias," meaning that the area can be selected with the SELECT customer command, for example. Alternatively, you can specify an alias other than the filename for a file/work area.

The SORT command now handles multiple fields and is fast. The AVERAGE command calculates averages. The PROCEDURE command opens a program file that you have previously created and that contains program segments terminated by the RETURN command. Once the procedure file is opened, each of the up to 32 procedures stored there can be called directly, without the delay normally experienced when a disk file is opened.

Several new language constructs make the *dBASE III* language more structured. Variables can now be categorized as PUBLIC or PRIVATE (akin to the terms global and local in other languages), to control the scope over which variables are active. A new PARAMETERS command can pass values to called routines. The EXIT command leaves a loop and continues with the statement following the ENDDO command, for improved flow control. The RETURN TO MASTER command returns control to the "top" of a program system rather than to the program that called the routine, a useful feature in menu-driven application systems. An explicit CLOSE statement has also been added to the *dBASE III* language.

Other new commands make programming easier and improve the convenience of the operating environment. For example, the COPY FILE command can copy any file, the ERASE command deletes files, and the DIR command displays directories (with full use of DOS 2.x subdirectories). The RUN command executes any external program and returns to *dBASE III*, the SET command has several new settable parameters (and a full-screen command to modify them), the TYPE command displays or prints external text files, and the ZAP command completely clears a data file (like the DELETE ALL command followed by the PACK command does in *dBASE II*, but faster).

Perhaps the nicest addition to *dBASE III* is the SET RELATION TO command, which links two databases according to a key expression. This command is not the linkage mechanism used to work around the field limitations of *dBASE II*. The new command can be used to link multiple files so movement of the record pointer in one file also moves the record pointers in the linked files.

A few changes may require you to amend your programming style. Ashton-Tate has changed the DO WHILE command to forbid macros in the control statement, claiming a 30 percent speed advantage. *dBASE III* automatically releases variables created in a module when control passes to a "higher" module. This capability was needed more in *dBASE II*, where memory variables were limited to 64 rather than 256, and can lead to some interesting surprises.

(continued)

Several new functions have been added. The CDOW, CTOD, CMONTH, DATE, DAY, DOW, DTOC, MONTH, TIME, and YEAR commands handle character/date conversions and other date and time manipulations. String functions now include the AT and SUBSTR commands for substring search and selection, the LOWER and UPPER commands for case conversion, and the SPACE command to generate blank spaces. Other new control functions include the BOF, COL, DELETED, FILE, PCOL, PROW, RECNO, ROW, and TYPE commands.

Utilities

These language enhancements are exciting and useful. They make the *dBASE III* language much more powerful than *dBASE II*'s. However, compatibility is far from total. Converting *dBASE II* program files to *dBASE III* is not necessarily easy, depending on the complexity of the *dBASE II* source program. Ashton-Tate supplies a utility named dCONVERT to aid in the conversion process. The preliminary documentation includes an article by well-known *dBASE II* trainer Adam Green; it discusses dCONVERT's operation and points out the pitfalls. It appears that dCONVERT can be expected to perform perhaps 80 percent of the necessary conversion automatically. The utility marks lines it has changed with comments, which is helpful in seeing what the program has done. Suffice it to say that while dCONVERT is certainly helpful, quite a bit of manual effort is still required.

dCONVERT is also necessary to convert all the other files in a database system. *dBASE III* .DBF files have a different header structure than those in *dBASE II*, so they must be converted, too. dCONVERT doesn't convert index files; it creates a two-line program that can be run under *dBASE III* to recreate an appropriate index.

Ashton-Tate also provides a dFORMAT utility to paint screens and reports. After you have painted the desired format, dFORMAT creates *dBASE III* language files with the code required to execute the screen or report. It works well.

Performance

Ashton-Tate emphasizes *dBASE III*'s speed improvement over *dBASE II*, especially with the SORT command. To check these claims, I loaded the three data files supplied by *PC* for Project: Database. The PERSON and SALARY files loaded in 31 seconds each, and the DEPT file took 43 seconds. Given that some other database managers tested for the project took over an hour to load each of these files, this speed was certainly acceptable.

Converting dBASE II program files to dBASE III is not necessarily easy, depending on the complexity of the source dBASE II program.

Sorting PERSON by last name took 44 seconds, about 4 times faster than *dBASE II*. Other sorts with various sample files on both character and numeric keys showed that *dBASE III* was always at least 3 times faster and sometimes 10 to 20 times faster than *dBASE II*. Indexing and other file operations were also significantly faster with *dBASE III*, but the speed increments were not as great as with SORT.

I was impressed with the little niceties added to the new product. The SORT command shows the percentage sorted during the sort process; many other commands provide an exact running count of their progress in a fixed position at the bottom of the display. Even COPY FILE shows the number of bytes transferred as it proceeds. *dBASE III*'s screens are much more attractive than *dBASE II*'s, and the help provisions and operator prompting are greatly improved.

I created a language file to produce a simple report accessing all three *PC* data files. This would have been something of a task with *dBASE II*'s two-file limitations, but it was easy with *dBASE III*.

I deliberately indexed two of the sample files and sorted the third prior to beginning output. (This is actually not a bad way to program reports in a complex system because it ensures that all keys are current when a report is printed.) In earlier versions of *dBASE II*, such programming was so slow as to be unacceptable. *dBASE III* took only 1½ minutes to begin output—and that's for two indexes and a sort.

I was intrigued by the new SET RELATION TO command. The manual states that only one such relation can be set up in each of the ten work areas, but it occurred to me that perhaps I could relate the file in area 1 to that in area 2 and then relate the file in area 2 to that in area 3. This turns out to work.

Summary

dBASE III is a major advance over *dBASE II*. It is faster in almost all respects, its language is more sophisticated and powerful, its help and assistance support is more useful. The overall feel of the product is silky smooth.

At first I did not believe that the benefits of converting existing applications written in *dBASE II* over to *dBASE III* would justify the considerable time required. The more I worked with the new version, however, the more I felt that the added speed and convenience would make the process worthwhile.

dBASE III is likable, whether considered on its own or in comparison with its predecessor or competitive products. Ashton-Tate has produced another winner that will help assure the company's continued dominance of the microcomputer database market.

—Glenn A. Hart

How To Be Your Own Best Financial Advisor

Best-selling financial author Andrew Tobias has turned his talents to software with a personal finance program called Managing Your Money.

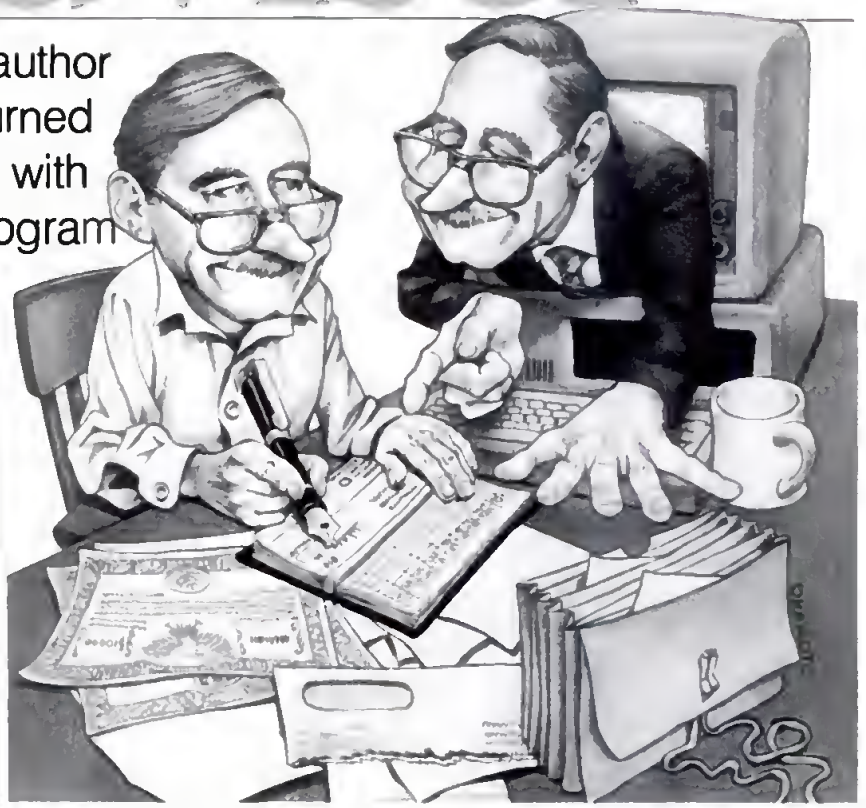

Illustration: Mike Okamoto

Andrew Tobias, Harvard MBA and author of such best-selling books as *Fire and Ice*, *The Only Investment Guide You'll Ever Need*, and *The Invisible Bankers*, has turned his creative talents to what he no doubt hopes will be another best seller, a personal finance program called *Managing Your Money*. The program, the result of a collaboration between Tobias and Micro Computer Corporation of America, is a kind of everyperson's financial computer program that integrates financial, investment, home accounting, and tax programs for your PC, XT, or PC*jr*. Like several of Tobias' books, this program helps the average person gain mastery over a complex subject—in this case, personal finances.

Managing Your Money is a menu-driven program with seven major components including insurance planning, budgeting and checkbook maintenance, investment portfolio management, income-tax estimator, financial calculator, a reminder system for important dates, and a net-worth calculator. (The seventh function, also referred to as a "personal balance sheet," is actually a composite of the previous six functions, as it needs all the

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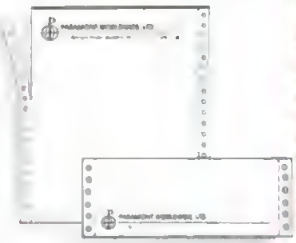

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information previously entered there to determine net worth.) An eighth module, which will serve as a telecommunications link for one or more electronic databases to automatically update securities prices, will be available this fall.

The package consists of three disks. Although you can make backups of the second and third disks, the first program disk is copy-protected. You can't even make backups for legitimate security or archival purposes. Don't worry about inadvertently mixing up the disks, though. A beep and an on-screen instruction will tell you when to put which disk in which drive.

The first program disk is copy-protected, and you can't even make backups for security or archival purposes.

The program runs on either a monochrome or a color monitor, but the graphs are difficult to see without a color screen. So, after you boot up, change colors with the F1 through F10 special function keys to find a combination that's comfortable for your eyes.

Prompt Relief

The program, by and large, is easy to operate. After guiding you through the set-up procedure, the manual becomes unnecessary because the screen prompts you for every move. The extensive on-line help function, written in a conversational tone free of technological or high-finance jar-

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gon, tells you basically everything you need to know to run this program. Just hit the Esc key at any point for help. When you're done with the detailed on-screen explanation, hit the Esc key again and resume work.

There's also a comprehensive electronic index ranging from "archiving" to "who wrote what" reachable from the main menu. From the index, you can get a brief explanation of any listing as well as step-by-step directions on how to get to that particular part of the program. If you still feel insecure, print out a hard copy of the index.

> After guiding you through the setup procedure, the manual becomes unnecessary because the screen prompts you for every move.

To understand how the program works in practice, the following is provided as a discussion of how to use the components, both singly and together, to help make financial decisions.

For instance, if you are thinking about buying or changing insurance plans you will, no doubt, have questions. These might include: How much life insurance do I need? How much can I afford? What are my choices in the marketplace? With the insurance-planning option you can find answers tailored to your personal situation.

You can also get a good overview of the ins and outs of insurance from a consumer's perspective, including advice on how not to bother with life insurance unless you have dependents and an explanation of why you should buy term rather than whole-life coverage. Or, if you already own a whole-life policy, *Managing Your Money* can analyze its investment value. This module will also inventory other insurance policies you may have, such as life, health, auto, and homeowner's.

To determine your appropriate coverage, *Managing Your Money* will need certain facts. First complete the fill-in-

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the-blank life-expectancy questionnaire. Based on such factors as age, occupation, gender, marital status, life style, occupational risk level, and even how often you wear a seat belt, the program will determine your projected life expectancy. Further answers to questions about how much money your dependents will need annually and how many years you want to provide support for them will help decide what insurance plan is best for you.

This module is good for "what-if" scenarios. For example, if you think the premiums are too high for the recommended face value of a given kind of coverage, substitute different amounts, and you can find out what kind of posthumous support would be provided.

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Experiment with the projected interest rate for the policy principal, or the number of years of support.

No-Fuss Budgets

The budget and checking component will store transactions for accounts you set up, typically checking, charge, and savings accounts. And there's a field to indicate the tax status of any transaction, including the Internal Revenue Service form that should be used to reflect the expenditure or source of income. Because of the interrelationship between the *Managing Your Money* modules, transactions entered here will automatically be reflected, where appropriate, in other modules, such as the income-tax estimator and net-worth statement.

The program, because of its flexibility, is good for home or small business budgeting. For example, you can replicate one month's budget figure, such as January's $350 rent, for each month of the year. Or you can have a figure automatically altered, say, by compounding January's base $175 dividends by 1.5 percent for each subsequent month or by increasing each month's sales commission by

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$334.49. The program comes with sample budget categories that can be tailored to your situation. Despite Tobias' avowed lack of knowledge about computers, one budget category is predefined for software and computer hardware expenditures.

Graphic displays make the numbers even more comprehensible. Figure 1 shows a chart of a family's income sources including salaries, dividends, interest, and gifts. You can also create a bar graph comparing actual against budgeted expenditures.

Your Investment Counselor

Monitoring investments is a breeze with the investment portfolio management module. Data entry is facile, as is updating the market price of your assets. You can define special codes for up to 26 individuals or institutions that recommend investments to you—allowing you to recall whose sage counsel left you holding an empty bag. And you can mark portfolios either as taxable, as tax-deferred Individual Retirement or Keogh accounts, or, if you like playing the stock market with imaginary dollars for fun or practice, as hypothetical.

When you log onto the portfolio-management function, its memory displays any significant events. You'll be advised, for example, that a holding is moving from short- to long-term status or that the scheduled date for clipping a coupon or rolling over a Treasury bill is fast approaching.

With the program, portfolios can be analyzed for appreciation and yield, individually and in the aggregate. You can also do graphs in a variety of ways, by risk level from low to speculative, by industry group, liquidity, and taxable or tax-free status. The program also compares what you've paid in brokerage commissions with what discount brokerage firms would charge for handling the same trades. "We're not saying you should switch, just letting you know roughly what your broker's advice and personalized service cost so you can make an informed decision," the program informs you.

Here, as in the budgeting and checkbook component, the number of recordable transactions is limited by the memory capacity of your system. However, selling shares in Electronic Pseudointelligence, Ltd., or dumping your Old Hickory Distillery 8.7 percent bonds will help to free

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CIRCLE 427 ON READER SERVICE CARD

up memory for active investments.

The most common use for the portfolio manager module is keeping track of traditional investments such as stocks and bonds. However, it can also be used to track your collection of stamps, antique silver spoons, Canadian coins, or Civil War tokens. It's even possible to use it to keep tabs on the mileage credits you accumulate under airlines' frequent-traveler programs; each new trip adds miles to your "holdings."

Numbers Crunching

With the financial calculator, you can maintain records of outstanding loans, analyze real-estate investments, do retirement planning, and handle such mathematical chores as calculating monthly mortgage payments and compounding interest.

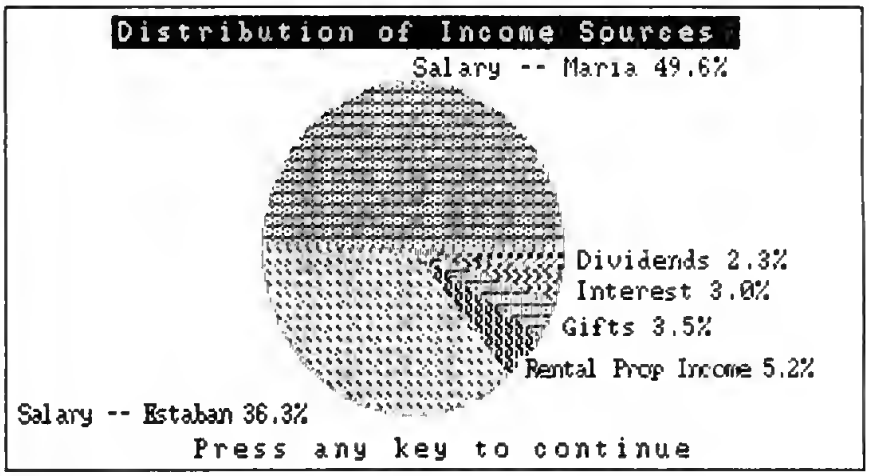

Figure 1: *A chart of income sources generated by Managing Your Money.*

Even though I'm not looking to retire in the near future, I found the retirement-planning process fascinating. To use this function, select "retirement planning" from the financial calculator mini-menu. As you can see in Figure 2, the screen

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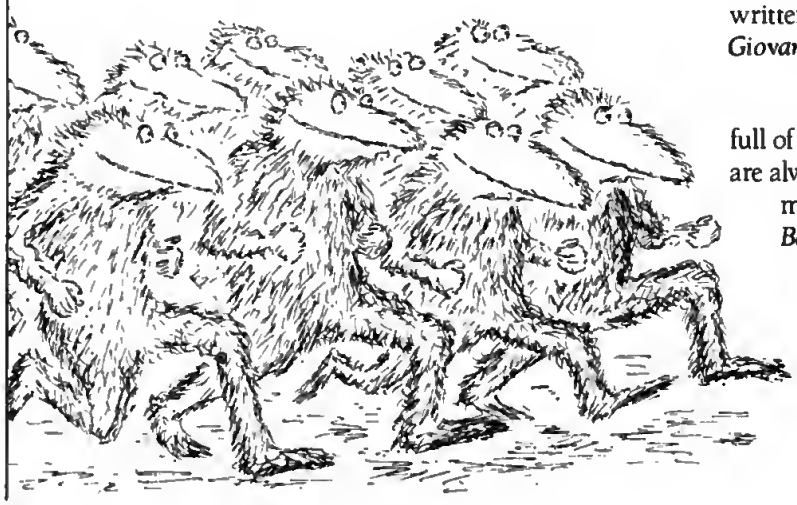

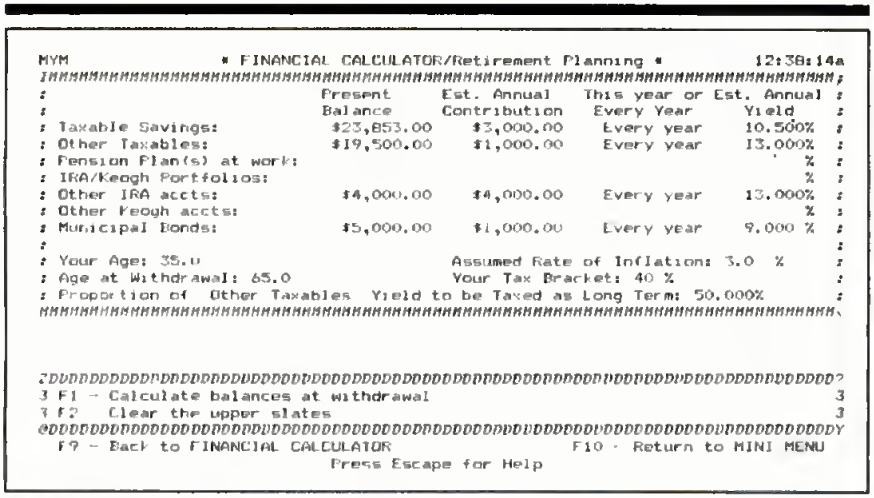

Figure 2: *The retirement-planning function from Managing Your Money.*

contains horizontal rows for taxable assets, employee pension plans, municipal bonds, and IRA and Keogh accounts. In the four vertical rows for each category you fill in the present value, estimated future payments, whether these contributions will be made annually or only once, and the estimated yield for each investment category at the bottom of the chart. Fill in your tax bracket, current age, planned retirement age, and assumed inflation rate during the intervening years.

Press F1 to calculate the balance at the time you begin withdrawing. Presto. You get your assets at retirement, both in actual dollars and adjusted for inflation. Play around with the number of years over which you'll withdraw the money and see how much you'd get annually before and after taxes. With graphs, examine your retirement assets by source, see how an Individual Retirement Account or Keogh has affected your retirement funds, and compare what proportion of your holdings came from appreciation as opposed to cash contributions. *(continued)*

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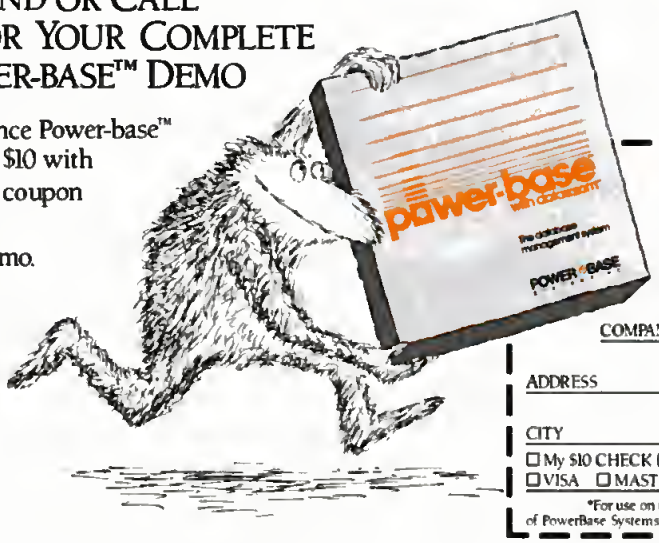

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CIRCLE 160 ON READER SERVICE CARD

The Landlord Option

If you own rental property or are thinking of buying some, choose "investment analysis & rental properties" from the financial calculator mini-menu. With information you provide on the mortgage rate and term, maintenance expenses, anticipated rents, property tax payments, and depreciation, you can measure net taxable income or loss on the property, after-tax cash inflow or outflow, cumulative cash flow, and internal rate of return. That knowledge could help head off a costly mistake, give you timely warning to abandon a bad investment, or reassure you that buying that centrally located, 23-unit apartment building last spring was a wise move.

By assimilating numbers entered in other modules, *Managing Your Money* can calculate your net worth. The cash value of insurance policies, the market value of your mutual funds, and the balance in your savings accounts are reflected as assets. Conversely, unpaid credit-card purchases and outstanding student loans and mortgages are reflected as liabilities.

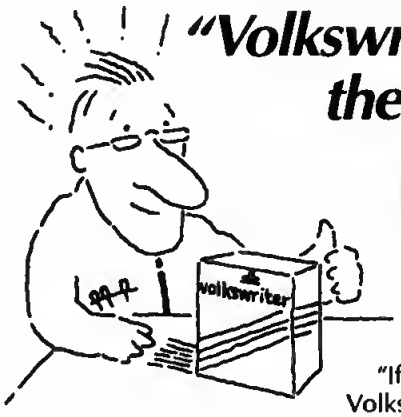
Using the net-worth calculation, you can also input assets and liabilities that were not previously entered into your calculations. For example, you could inventory the turquoise jewelry or the rare stamp collection in your safe-deposit box or enter the market price of your three antique cars. Their value would then be included with your other assets.

The Icing and the Crumbs

Some extra touches add value and user friendliness to this package. One such touch is the on-line calculator, which you call onto the screen with a mere touch of the NumLock key. Using the calculator you can enter equations or formulas in the work area at the bottom of the monitor, then transfer the answers to the appropriate field.

Flexibility is another desirable feature. There are no grating error messages, for example, when you enter data without commas or dollar signs. Instead, the program quietly accepts what you have given it and automatically puts it into the proper display form.

A third asset—especially for novices—is the program's reassuring style. "There is practically no way you can screw things up," you're told early on.



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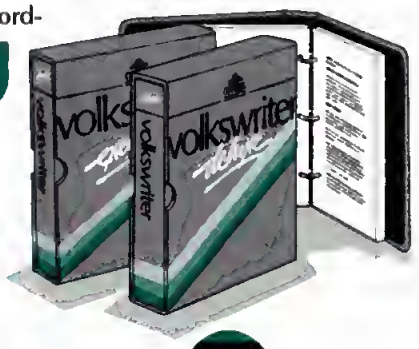

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CIRCLE 385 ON READER SERVICE CARD

Lest you be daunted by the magnitude of moving your finances into the computer age, the program gently advises that it will take "a little time and discipline to get organized," but then shows why it can be time and discipline well invested.

Managing Your Money can't do everything, and not everything it does is done well. This deficit is acutely evident around April 15. Its tax estimator does exactly that—estimate. Estimates may be helpful for tax planning and for girding yourself against the shock of what you owe Uncle Sam, but it's no substitute for a dedicated income-tax software program replete with tax forms and tables. The IRS doesn't work according to estimates.

> By assimilating numbers entered in other modules, Managing Your Money can calculate your net worth.

Another limitation is that you can't make a screen print of a graph on your monitor using the standard PrtSc-Shift combination unless you first run the "graphics" program on DOS 2.0 or a later version. If you try, the system will crash and must then be rebooted, as I learned the hard way.

I was also irked by the author's computerized plugs for his own books. For example, if you look up "reference books" in the index, you'll be referred to Tobias' *The Only Investment Guide You'll Ever Need;* this kind of self-promotion is more appropriately tucked away in the back of the manual in a special bibliographic section.

Speaking of the Manual

And speaking of the manual—well—the problem is that there's not much to speak of. It features a sketchy overview of the program, a few cautionary words, information on ordering computerized checks, and a start on the setup procedure. It consists of a paltry 38 pages beaming with white space, good only for doodling. But all in all, these are only quibbles about a program that proved to be far more than expected. ■

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CIRCLE 194 ON READER SERVICE CARD

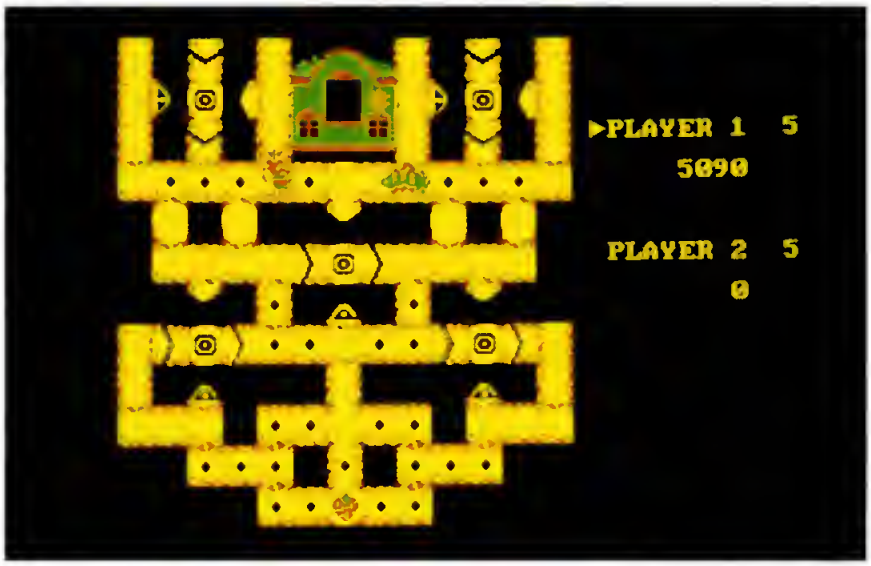
Cool Caterpillar

A game called Changes brings the mysteries of the Orient to a scrolling maze-chase starring a caterpillar, while Mr. Cool is a simple but fun descendant of Q-Bert and J-Bird.

Ah, the inscrutable Orient, home of gaudy red and yellow dragons crafted from papier-mâché, of Thousand-Year-Old Eggs made fresh daily, and of computers called Oranges and Tangerines. The Orient—where what you see is not necessarily what you get.

So it is with *Changes*, what I understand to be the first software imported from Asia for the IBM PC. It comes from Tigervision, the computer game division of a company called Tiger Electronics, which markets various kinds of electronic toys. *Changes* is made and packaged in Hong Kong.

I must confess to being uncertain about my feelings toward this game. It is by no means a breakthrough concept like *Lode Runner;* it is not a programming tour-de-force like *Flight Simulator;* it is nowhere near as nerve-wracking and all-consuming as *Crossfire* or *Styx*. It's not even that much fun to play over and over again. Nonetheless, it does possess a few nice touches of design and graphics that piqued my interest.



A view of one end of e *Changes* maze reveals a bad guy in hot pursuit of the quickly crawling caterpillar.

PC FACT FILE

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Requires: 64K RAM, color/graphics adapter, color monitor. Game adapter and joysticks optional.

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The story line, what there is of it, goes like this: "Guide the caterpillar through the maze in the forest eating all the power pills but beware the maze is infested with monster insects." (Don't blame me for the grammar, please.) "This is a maze game like none you've ever played before: multiple mazes, multiple and changing paths, horizontally scrolling mazes and surprises you'll find only by playing."

Realistically, though, it's hardly a "maze game like none you've ever played before" unless you're one of the 17 people in the United States who have never played *Pac-Man*. It uses the same concept of power pills that allow you to turn the tables on your pursuers and gobble them up for points. But there are some differences, the principal one involving the concept of "horizontally scrolling mazes."

Actually, I tend to think of *Changes'*

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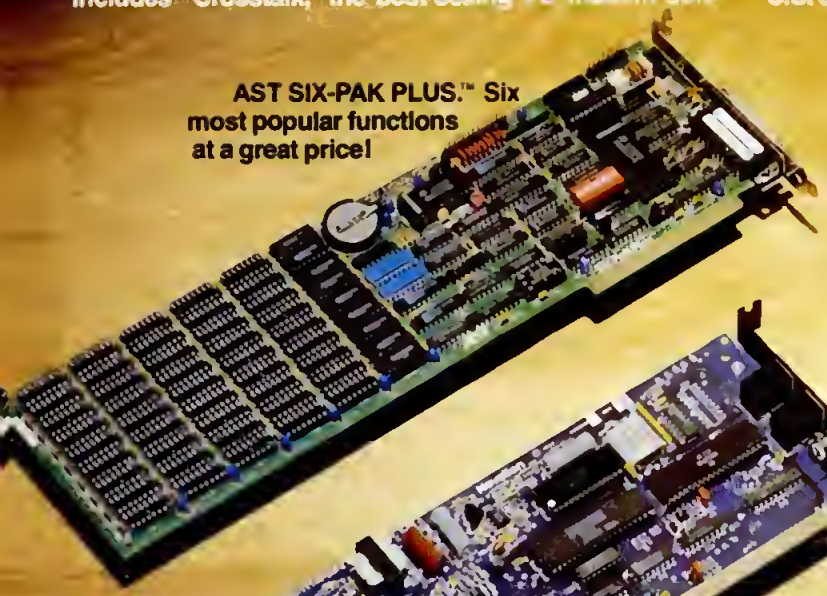

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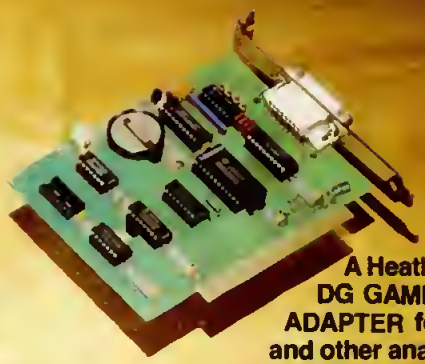

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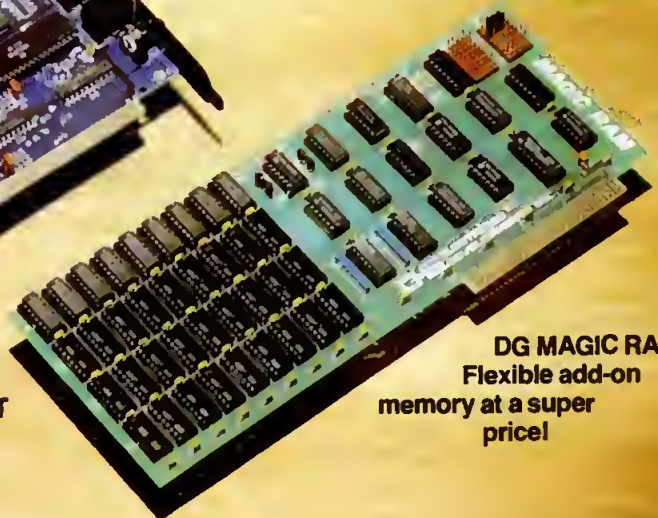

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maze as vertically scrolling, but let's not quibble. What you see on the screen represents perhaps one-third of the maze. As you guide your caterpillar to the top or bottom of the screen and beyond, the maze moves up or down like a window shade. It's fun to watch and a nice way to pack more maze onto the PC's screen without having to reduce the size of the image. It also allows changing the aspect ratio from the standard 4:3 television-screen format to an elongated scroll. (This scheme has not been used much for games for the PC, but it's used to great advantage in a new game for the PC*jr*, called *Microsurgeon*, in which you are engaged on a *Fantastic Voyage*-like adventure inside a human body, which is, as we know, usually taller than it is wide.)

Changes also incorporates a unique use of switches in the maze. These switches are bridges from one section of the maze to another. After you guide your caterpillar across one of the bridges, it rotates 90 degrees to connect different points in the maze. If you do it right, you'll temporarily cut off your pursuers; do it wrong and you've boxed yourself in with the bad guys.

Speaking of bad guys, I have nothing nice to say about the authors of the game's instructions. You're essentially on your own with this one, folks. For example, theoretically a joystick can move your caterpillar around the maze. In practice, however, I found it difficult to make the sort of precision moves needed for a high-scoring game. The game was much more playable using the keys on the keyboard, but the instructions did not even hint that the game could be played this way. I had to figure that one out for myself.

The game maintains high scores only in RAM; no record is made on the copy-protected disk. There is no pause control mentioned in the instructions, but I found you could stop the game with the Ctrl-NumLock key combination (unfortunately, this caused some unpredictable restarts). There is no way to shut off the sound, and no reset key is provided.

Fast Switchover

I cannot recommend *Changes*' two-player version because the switchover between turns comes so fast that I can't see how you could play against a partner unless that partner were sitting in your lap. Then again. . . .

I'm also not pleased with game manufacturers that do not provide a screen shot or a realistic artistic rendering of the appearance of the game on the model of computer the product is aimed at. The gaudy red-and-yellow box for *Changes* does attract the eye but tells nothing about the nature of the game inside.

Changes is obviously derived from the aforementioned *Pac-Man*, as well as *Dig Dug* and other above- and below-ground maze chases. These games are not bad as ancestors go, but very little new ground is broken here. *Changes* hints at more promise for the future than it delivers in the present. Perhaps we should judge this early import from the East in light of the knowledge that the original Japanese cars were scoffed at and ignored by Detroit. That turned out to be a mistake. And don't forget that *Pac-Man* was a Japanese invention. Who knows what else is coming down the pike? Perhaps a space shoot-'em-up featuring papier-mâché dragons and Thousand-Year-Old Eggs.

Changes hints at more promise for the future than it delivers in the present.

I'm going to give this one a lukewarm score and hope for better fortunes to come. This game is a treat for the eyes, but a bore for the brain. On *PC Magazine*'s rating scale from a low of 0 to a high of 6, *Changes* earns:

FUN:	3
CHALLENGE:	3.5
GRAPHICS/SOUND:	4.5
TOTAL:	11

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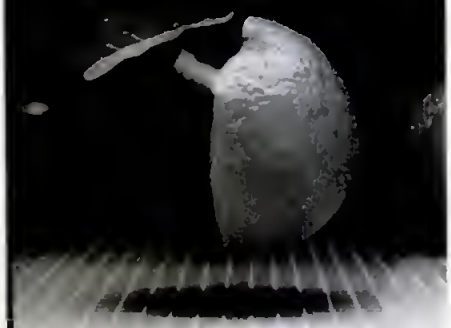

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PC ARCADE

BACK FILE

Mr. Cool
Sierra On-Line, Inc.
P.O. Box 485
Coarsegold, CA 93614
(209) 683-6858
List Price: $29.95
Requires: 64K RAM, color/graphics adapter, game adapter and joysticks optional.

CIRCLE 732 ON READER SERVICE CARD

Mr. Cool, yet another in the long, long list of offerings from Sierra On-Line, is an improvement upon the already wonderful arcade game *Q-Bert* and its personal computer compatriot, *J-Bird*. Your goal is to control a funny-looking little ice-cube-shaped guy called Mr. Cool as he jumps up and down and from side to side around a pyramid of differently colored landing positions. In the early part of the game, each time he lands on a position, the color changes. The goal is to turn all of the positions to a single color.

In the upper reaches, the colors change several times. In the topmost reaches, some of the positions in the pyramid are missing. In the highest of the high, some of the positions often disappear.

Mr. Cool must avoid passing the Hot Springs and occasional Fireballs that tumble down from above. And, in a nice fillip, your little ice cube must not only avoid contact with the Hot Springs and Fireballs, he must also take care not to land on a position on the pyramid too soon after they've been there, for the pyramid retains heat—and you've got to stay cool.

You can also invoke "Super Cool Time" by pressing the lower button on the joystick. For a few seconds, the attackers are transmogrified into ice water. (There are only a limited number of Super Cool Times on each level.)

This game plays much better from the joystick than from the keyboard. However, designer Pete Oliphant has devised an unusually well-thought-out choice of keys if you must use the board: D is up/left; K is

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up/right; M is down/left; C is down/right; the spacebar stops Mr. Cool; S calls for Super Cool Time.

The game includes a pile of nice features, including maintaining high scores on disk, a toggle to turn the sound on or off, a pause control that uses the Esc key, a restart option, and a return to the main menu. The menu options, by the way, offer you the choice of a starting level, which is a good way to practice on the upper levels, and a quick route into the more challenging reaches.

All in all, *Mr. Cool* is, well, pretty cool. On *PC Magazine*'s scale, it ices this issue's competition:

FUN:	5
CHALLENGE:	4.5
SOUND/GRAPHICS:	4
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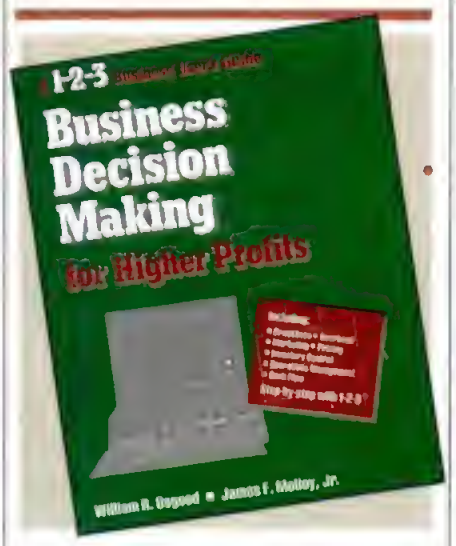
Gaining Financial Control: Two Guide Books

Business Decision Making for Higher Profits and Automating Your Financial Portfolio are two books that can help you use the PC for maximizing business and investment earnings.

Business Decision Making for Higher Profits A 1-2-3 Business User's Guide, is part of a series focusing on using *1-2-3* for financial applications. This book was designed for managers of small businesses who want to use a personal computer and Lotus' *1-2-3* software to improve their financial decision-making.

The reader is led step by step through the process of building several financially oriented Lotus' *1-2-3* worksheets. Among the topics covered are simplified income statements, balance sheets, and financial ratios. These are tied into an analysis of fixed and variable costs and break-even point determination.

The reader learns the basics of small-business accounting by actually building the analysis. Instructions are detailed and



to computers might not be able to construct the spreadsheet, almost anyone else would have no trouble. Each chapter includes useful hints on specific *1-2-3* commands. An accompanying optional diskette contains all the spreadsheets described in the book. This diskette saves you the trouble of entering the examples by hand.

While the authors succeed admirably at teaching basic computer-spreadsheet skills, they do not cover any of the advanced features that make *1-2-3* special. These include keyboard macros, data management, and graphics. As constructed, the examples only use very simple spreadsheet techniques.

Same Simple Level

The book treats financial analysis at roughly the same level. The income statement and balance sheets have been simplified to the point where many lines are entered as predetermined numbers instead of being calculated by the reader. For example, interest expenses are not based on the external debt, which makes it possible to double debt while leaving interest expenses unaffected. There is no discussion of accelerated versus straight-line depreciation, which is unfortunate because these differences have important consequences on net income and tax liabilities. Presumably the business owner would want to try out several different "what-if" scenarios based on different allowable depreciation schedules. The text glosses over the point that the book's balance sheet uses cash as the calculated item that forces assets to equal liabilities plus owner's equity, a good way to track a company's financial position.

In spite of these limitations, *Business Decision Making* does provide a good starting point for people who want and

PC MAGAZINE

Business Decision Making for Higher Profits: A 1-2-3 Business User's Guide
William R. Osgood and James F. Molloy, Jr.
Curtin & London, Inc., and Van Nostrand Reinhold Company
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(212) 265-8700
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CIRCLE 767 ON READER SERVICE CARD

need a set of examples of spreadsheet applications for business analysis. To its credit, it focuses on the financial analysis problem as a whole, not only on Lotus' *1-2-3*. The worksheets that the book constructs, too simple to be useful for an actual business, could still form the basis for real-world analyses.—**R.W.**

Automating Your Financial Portfolio: An Investor's Guide to Personal Computers compares succeeding in the stock market to trying to shoot down enemy planes from a moving ship: The planes are the stocks, the ship represents your financial position, the ocean is the equivalent of general market conditions, and the weather is like the general economy. Author Donald Woodwell maintains that until recently, massive firepower was required to hit one plane, that is, to choose a single high-flying stock.

Today, the same computer technology that has revolutionized naval warfare can be used by investors to choose the most worthwhile investments. According to Woodwell, a computer-controlled stock-evaluation program can allow you to accurately select and track your stock in any economic climate or market condition, and getting a computer to help you invest more successfully implies that you are serious about using it to increase your income.

A Rare Find

Automating Your Financial Portfolio is one of those rare books that will interest both novice and experienced investors as well as general computer owners. The many topics covered include the basics of proper financial planning; choosing the software for monitoring and analyzing bonds, real estate, stock options, and related investments; and choosing from among the various information utilities. Moreover, the author gets his points across plainly and quickly, while requiring you to learn only a minimum of computer and financial terms.

The book points out that most investors can do almost all the financial planning and investment analysis they need with only four basic software packages: an electronic spreadsheet, a personal finance manager, a program for communicating with an information service, and a tax-preparation program. Other programs, such as portfolio managers, technical analyzers, and data management

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BOOK REVIEW

systems, support the basic investor programs and are thus optional.

According to the book, one of the major benefits of an automated portfolio is that it allows investors to forecast their personal financial expectations. "Knowing how much cash you can get your hands on when you need it can give you an edge . . . by enabling you to respond more quickly to market conditions."

While the author is optimistic about the uses of a computer to help investors make better investment decisions, he believes that a computer is merely a means to an end. It is the investor, not the computer, who must make the actual decisions. "The final selection of stocks in your portfolio is a judgmental decision," says Woodwell. "By themselves, indicators only point out trends and possible directions in stock prices and volumes. It is up to you to understand the interpretation of these indicators and apply them."

Woodwell advises that it is extremely important for investors to integrate all of their personal finances into their automated portfolios. He claims that the interrelationship among the various parts is vitally important to the success of your total program. You must always ask yourself, "Has my net worth increased as a result of my investing efforts?"

Using the proper software, you can play "what-if" with the tax consequences of a variety of investments. You can then choose the one that offers you the best after-tax performances. One of the major reasons for investors to use computers is that it forces them to define their investment objectives in quantitive terms. Therefore, he advises investors to be "precise in recording details and to fully define the relationships between the various elements in your portfolio."

A copy of *Automating Your Financial Portfolio* should be within easy reach of any serious investor's computer, portfolio, and checkbook.—**R.K.**

Automating Your Financial Portfolio—An Investor's Guide to Personal Computers
Donald Woodwell
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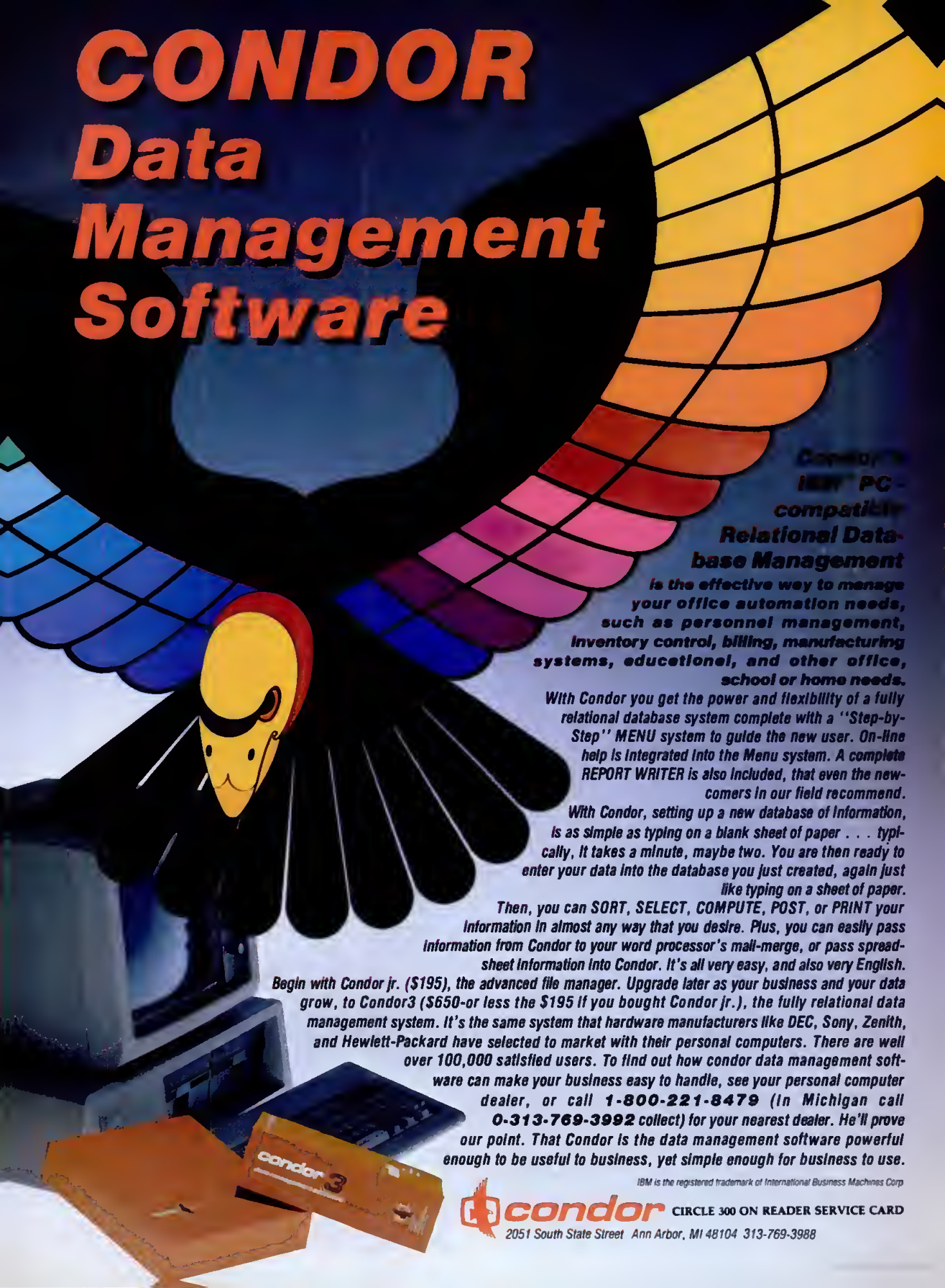

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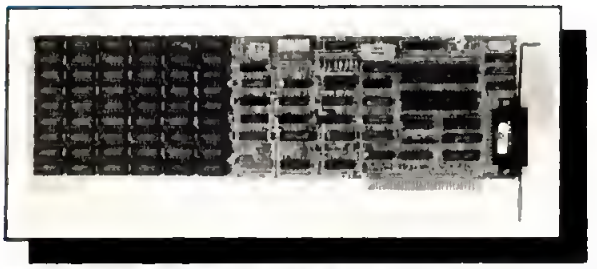

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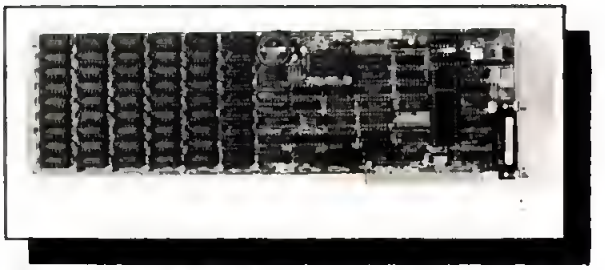

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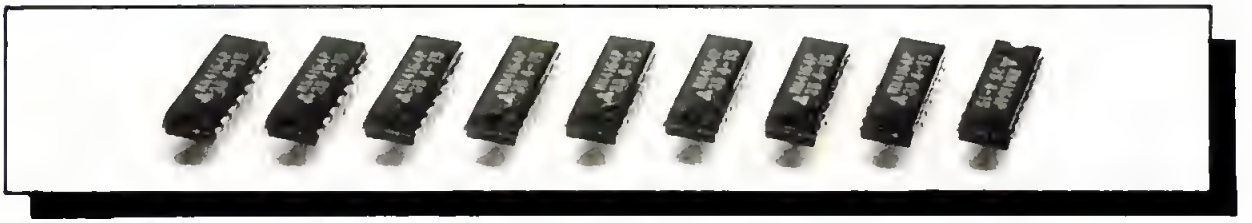

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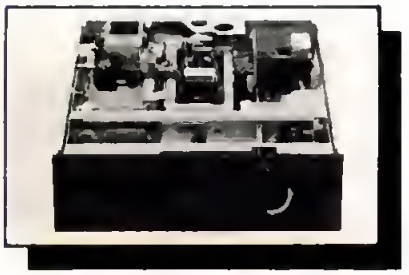

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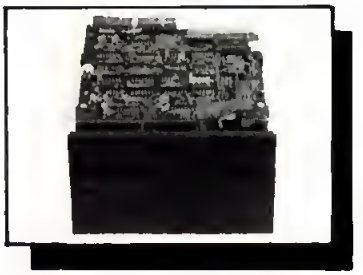

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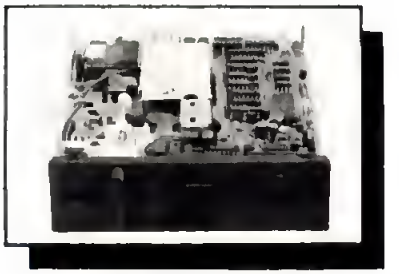

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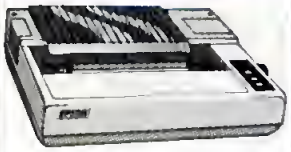

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CIRCLE 264 ON READER SERVICE CARD

Accounting For Contractors

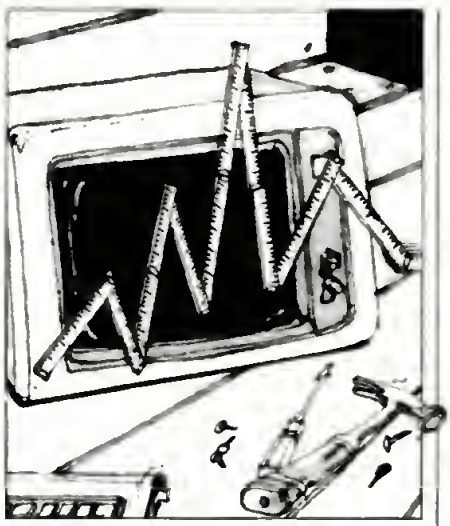
Computerized accounting packages offer benefits to all kinds of contractors. You'll need to choose carefully to make sure you end up with one that fits your particular requirements.

Personal computers have given construction contractors, like many other small businesses, the ability to automate their bookkeeping and accounting functions. Whether you're a general contractor tracking your subcontractors or a subcontractor with a large payroll, there are a wide variety of accounting programs available for the PC that will meet most of your requirements. But a contractor's requirements can go beyond the scope of most general-purpose accounting programs, so contractors looking to automate must shop carefully to find the features they need. These include special payroll (multistate, multiunion, variable workman's compensation, variable overtime rates), accounts payable (subcontract retention, lien reports), accounts receivable (contract billing, retainage calculations), purchase order control, job cost accounting, and equipment costing.

Payroll

Contractors' payrolls can be highly volatile and complex. Employees are regularly added, laid off, and rehired, and each employee's hours may vary from week to week, depending on the weather.

In addition, construction workers may be paid at different wage rates for different



tasks. In some cases, premiums are paid for working in more dangerous locations, such as higher elevations or tunnels. Similarly, the workman's compensation insurance rates vary depending on the craft the employee is working, his job, and the jurisdiction the project is in. To further complicate matters, workman's compensation is computed on only the straight-time portion of overtime pay.

And if handling straight-time rates seems complex, don't forget that construction work often involves two or more overtime rates (time and a half, double, triple, and shift premiums). In addition to normal payroll output—checks, W2 forms, and payroll taxes—workman's compensation, equal opportunity employment, and certified payroll reports may be necessary. For contractors with many jobs scattered around town, a routine that facilitates distribution by printing payroll checks in job order is often desirable.

If you are a small contractor looking for a program to handle payroll, you should begin by making up a checklist of the items required for your particular operation. Start by collecting copies of all reports produced by your current payroll system. Next, determine the number of employees the system must handle, including those who might be laid off after a particular job is finished but must be maintained for possible rehire. Then try to predict the maximum number of people your business might add in the next 3 to 5 years. Finally, determine what payroll periods your hourly and salaried personnel are paid on and make sure the program you choose supports these factors.

For nonunion contractors working in one state with a stable work force and employee wage rate, a standard, off-the-shelf payroll package may do the trick.

(continued)

Illustration: Michael Ng

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CIRCLE 317 ON READER SERVICE CARD

But as you begin adding special requirements, it becomes necessary to look for payroll software specifically designed to serve the needs of construction contractors. Fortunately, there are a number of such programs for the PC on the market. Most are part of integrated accounting systems and range in price from under $600 to over $2,000.

Job Cost Accounting

Integrally connected to payroll, job cost accounting allows the contractor to track labor costs according to type of work performed. Also known as costing, job costing, or job cost estimating, is a method whereby cost codes are allocated to the contractor's expenditures—payroll, material, equipment, and other items. These accounts are usually grouped by work type, specification divisions, phase, or location. As the job progresses, the contractor can produce reports that show exactly how much money is being spent and where. This information is then compared to the estimate for the job to give the contractor productivity information and to help identify problem areas. The cost data developed from completed jobs also helps estimate future jobs more accurately. Careful planning of the account codes, accurate reporting from the field, and software that can manipulate the data to produce useful and timely reports are all necessary to properly use this complex but valuable tool.

Accounts Payable

Contractors generally have a high volume of purchasing activities, including buying materials to be incorporated into the job, buying small tools and supplies, leasing equipment, and administering subcontracts. An accounts payable system can help the contractor save a substantial amount of money when it comes to determining short-term cash needs, taking advantage of vendor discounts, and borrowing cash when accounts receivable shows a shortfall.

For a small contractor, finding a suitable accounts payable package should not be a problem; many off-the-shelf products will be sufficient. As in payroll, though, be sure to pay attention to the number of vendors a program can maintain and the volume of transactions it can handle. Also look for special features that may be useful, such as provisions to produce and/or check vendor invoices against purchase orders. Of course, if you're buying a complete accounting system, you want to be sure that accounts payable information will be automatically posted to the general ledger and job cost functions.

Finding a suitable accounts payable package should not be a problem; many off-the-shelf products will be sufficient.

Accounts Receivable

The accounts receivable needs of contractors can vary considerably. General contractors are often retained by the owners with whom they have contracted. Their accounting systems should treat such retainage amounts not as an accounts receivable but as earnings withheld.

Maintenance contractors such as HVAC (heating, ventilation, and air conditioning), mechanical, or landscape firms often require an automatic billing system to produce invoices on a regular basis, much like the utility bills you get at home.

In some types of construction contracts, the contractor is paid according to a "draw schedule." The draw schedule specifies predetermined amounts of money to be paid at the end of an account period, typically each month, based on completion of certain amounts of work or

accomplishment of specified milestones.

General Ledger

Contractors have much the same general ledger requirements as most other businesses do, but they especially like to see multicompany capability since they often need to set up supply and equipment rental operations as separate entities. Unfortunately, multicompany capability is found mostly on minicomputer systems.

For IRS purposes, contractors need the ability to report revenue and expenses on both a "completed contract" and "percent-of-completion" basis. The first method means that expenses and revenue are not recognized until the contract is completed. The latter method allows the contractor, at the end of its fiscal year, to prorate revenue and expenses on the basis of the amount of the contract that has been physically completed. Contractors commonly keep two sets of books, one for IRS purposes and one for financial conditions. Such contractors require an accounting system that can report on both.

More than Bookkeeping

Computerizing the accounting functions of a construction company goes far beyond the mere automating of a few bookkeeping tasks. Computerization gives the contractor the opportunity to track costs, ride herd on subcontractors, manage cash flow more effectively, and eliminate duplicate payments or overpayments to vendors. Important financial statements can be produced quickly and accurately, helping the contractor to expand as the opportunity arises.

The technology has advanced so quickly that, whether you are automating just one function or installing a complete integrated accounting system, PC-based accounting systems can now practically match the features of minicomputer systems of only 4 years ago. Evaluate your own needs, familiarize yourself with the available options, choose carefully, and be sure to have your accounting firm give its approval to the package you ultimately select. ■

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CIRCLE 200 ON READER SERVICE CARD

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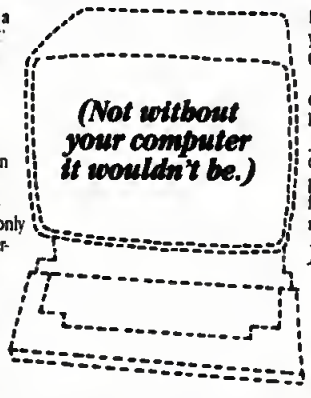

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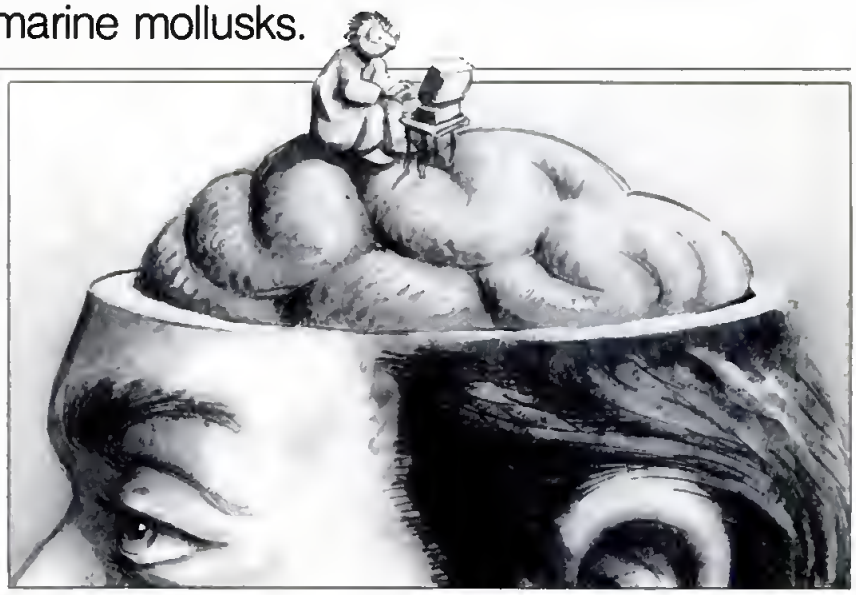
CIRCLE 341 ON READER SERVICE CARD

Coping with Complexity: PCs in Neurobiology

The PC, together with devices such as analog-to-digital converters, is helping scientists at the University of Illinois study nerve cell plasticity in marine mollusks.



Illustration, Peter deSeve

Understanding how the mammalian brain functions is one of the last frontiers of biology. The human brain's level of complexity for information processing is staggering. It contains roughly 10^{11} nerve cells (or neurons), each capable of interacting with hundreds of thousands of others. Perhaps the most significant technological advance in neurobiological research during the past few years was the introduction of computers to help cope with the tremendous complexity involved. Because of their versatility and power, microcomputers are becoming critical pieces of laboratory hardware in neurobiology.

Neurobiological research entails probing the mechanisms by which nerve cells function and interact with one another to produce behaviors and store and manipulate information. Even with help from a PC, mammalian brains are so complex that neurobiologists are often forced to start with a simpler system. Molluskan neurons are tens to hundreds of times larger than their mammalian counterparts, yet they number only in the thousands. And, in spite of their relative simplicity, mollusks display discrete, quantifiable behaviors and are capable of simple forms of learning.

Studying the giant nerve cells of mollusks can offer significant insights into the functioning of nerve cells in more complex organisms.

Drs. Martha and Rhanor Gillette and I are investigating mechanisms of nerve cell plasticity in the marine mollusk *Pleurobranchaea*. Through our research, we have identified an ionic current, stimulated by an endogenously occurring compound, cyclic 3′5′ adenosine monophosphate (cAMP), and regulated by calcium ions. The presence of cAMP induces this current and changes the excitability of the neuron. The two main avenues of our research are the mechanisms of cAMP induction of inward current and the regulation of cAMP activity by intracellular enzymes.

We use an IBM PC with a Tecmar 12-bit analog-to-digital (A/D) converter. A/D conversion allows the collection and analysis of data while an experiment is in progress. It is a great time saver, since collected data does not have to be transferred to a computer or calculator for analysis.

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coming voltage into a TTL (transistor-to-transistor logic) signal that the computer can handle. This process compares an unknown input voltage against some form of internally produced reference voltage. The reference voltage is changed until the difference between the two voltages falls below the resolution of the chip.

Integrated circuits can utilize several different methods of A/D conversion. The most common—as well as the fastest and most accurate—method is successive approximation, whereby the input voltage is compared bit by bit and complete conversion is accomplished in *n* steps for an *n*-bit converter. The dual-ramp (or slope) method, which is commonly found in most digital panel and multimeters, is also very accurate but has a much slower conversion time. The ultra-high-speed parallel technique is used for very-high-speed conversion, but its resolution is limited.

A/D and D/A packages can be assembled in several ways. Discrete components allow one to mix and match for the optimum system, but they generally require a better working knowledge of the whole system. The popular hybrid (multichip) converters are comprised of a ready-to-use package of components. Monolithic (single chip) converters are very inexpensive but generally not as good as hybrid or discrete systems. Successive-approximation hybrid A/D converters are probably the most appropriate choice for biomedical research.

Resolution is another consideration when choosing an A/D system. The selection is generally between 8, 12, 14, or 16 bits, and the choice depends on the desired speed, accuracy, and cost. Systems using 8-bit A/D converters are the most economical, easiest to use, and fastest, but the accuracy is only 1/256 of the full voltage range. Twelve bit A/D converters have a resolution of 1/4096 of the full voltage range and are still fast enough for most biological phenomena. A/D converters of 13 to 16 bits are available and are not too much slower than 12-bit converters, but the increased resolution is marginal.

Once the type of A/D converter and number of bits have been determined, a couple of other considerations remain. An A/D chip can convert only a limited range of input voltages. The most common input voltage ranges are 0 to 5, 0 to 10, and -10 to +10 volts. The proper range depends on your specific needs, but since negative potentials are frequently encountered in neurobiology, the -10 to +10 volt range is best.

> On-line collection is often the most accurate method of data collection.

It's useful to have several counters on your A/D board. If your instrumentation puts out a TTL-compatible signal, they can function as straight counters, and they can be cascaded to handle very large numbers. Alternatively, the counters can be programmed as clocks to trigger conversion to real-time data collection.

Signal conditioning is often necessary prior to data collection. Input signal gain should be scaled to take full advantage of the converter's input voltage range. Variable amplifiers to take care of this are simple to construct and work quite well. Even better, many AID boards feature software-programmable gains that are easier to manipulate during an experiment. Other signal conditioning devices include active filters to minimize unwanted noise prior to data collection and variable low- and high-pass filters to produce a narrow "window" of acceptable frequencies.

Our Tecmar Lab Master 12-bit A/D converter uses the 40 kHz switching frequency and programmable gain options to record membrane currents during patch and voltage clamping. Patch

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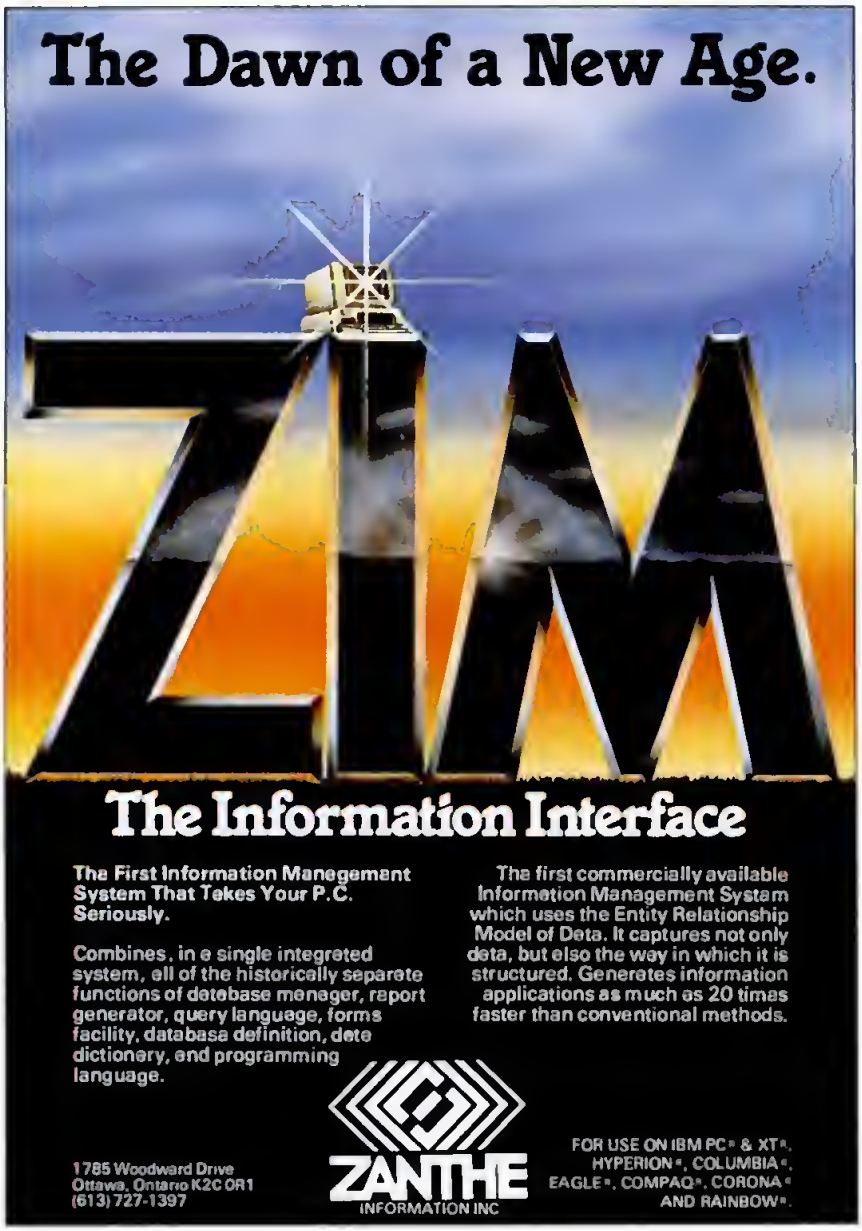
clamping is a new technique that allows electrical isolation and recording of a single-membrane protein channel. With this method, discrete openings and closings of iontophores can be monitored. We use this technique to examine the effects of cAMP and synergistically and antagonistically acting compounds on membrane current. The current flowing through each protein channel is roughly 1–2 picoamps (10–12 amps), so a good deal of amplification is required. Mean open time for each channel varies in the range of .1 to 10 milliseconds, so it is clearly necessary to sample as quickly as possible. We read the A/D signal from the port, immediately assign the value to a memory location, and then repeat the process until all usable RAM is filled. With this method, we can sample every 40 microseconds, with sampling periods of longer than 15 seconds. After the RAM is filled, the number in each memory location is read, converted to a voltage, and analyzed. We sample several 15-second bins to establish a baseline channel activity prior to experimental manipulation, and we then sample after the treatment to discern the change in channel activity.

Whole-cell voltage clamping involves monitoring the current flowing across the entire cell's membrane while holding the neuron's voltage at a desired potential. The current recorded is the summation of all the single-channel activities. The events of interest occur much more slowly (20 milliseconds to 60 seconds) than during patch clamping, so a slightly different A/D paradigm is required. Our voltage clamp experiments frequently involve intracellular injection of compounds or step changes in voltage, so A/D conversion is externally triggered to precisely coincide with the manipulation, and the voltage is sampled at regular intervals following the triggering stimulus.

The general types of research problems and methods of analysis we encounter in neurobiology are analogous to those encountered in many different areas of biology. With minimal effort, the PC and XT can be adapted to facilitate research in these other areas. ■

Daniel Green is a research assistant in neural and behaviorial biology at the University of Illinois at Champaign-Urbana.



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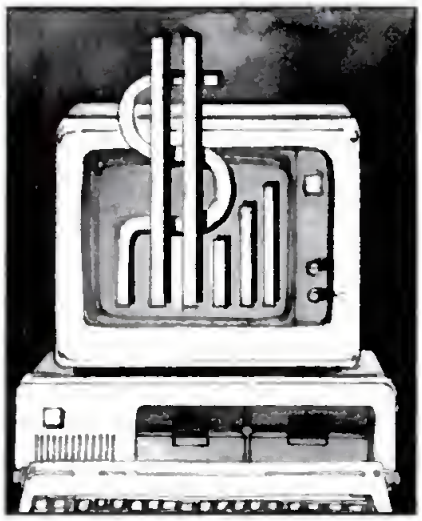
Bank Market Analysis on the PC

An integrated package built around a database management system can help commercial banks organize information about their individual and corporate customers.

Insight into your markets is a business necessity whether your company offers autos, perfume, widgets, or financial services. In commercial banking, competition is keen and customers are astute at selecting services by quality, features, and price. The PC can be a powerful aid to increasing insight.

A commercial bank offers a wide array of credit and service products, and each of its markets will utilize a different subset of those products. (A market is an aggregation of customers or prospects for a specific product or service or a group of products or services.) Within the broad market categories in commercial banking, there are many subgroups that, if identified, aid in making the business more profitable.

In the consumer sector, for example, some basic subgroups might be lower-income customers utilizing installment loans, credit cards, and checking accounts; upscale professional and managerial families utilizing the aforementioned products and, in addition, money market accounts, cash reserve, discount brokerage, and personal financial planning; and high-net-worth individuals utilizing financial planning, collateralized loans, and trust services. Within each of these subgroups there are still further refinements that would help marketing, such as the customer's age, whether or not he is a homeowner, and degree of credit risk.



The institutional sector can be broadly cut between domestic and international. In each category there are correspondent banks composed of smaller retail-oriented banks, regional banks, large commercial banks, and money center banks. In addition, the international sector includes central banks. The institutional sector may also include insurance companies, investment bankers and brokers, and financial "conglomerates." Again, further refinement will be extremely useful—by asset size, geographical location, and financial condition, for example.

Segmentation can help marketing planners identify those markets that contribute most to the bank's profitability, those that contribute to its prestige and reputation, and those that do both. Credit executives can plan levels of commitments and outstandings among the types of lending. Sales managers can optimize their calling plans. Product managers can enhance existing products to better meet the needs of customers. Marketing managers can optimize their use of the media for advertising and more carefully target direct mail promotions. Planning and budgeting management can more effectively allocate money, people, and equipment by market. Operations and systems can plan ahead.

Help From the PC

How can a PC help in all these areas? The number of ways is limited only by your own needs and responsibilities.

With database management software you can organize, reduce, and analyze data on customers acquired in the course of establishing relationships and processing transactions, to identify market segments. You can collect ad hoc competitive intelligence as obtained in sales calls, conferences, or informal sources for enhancing products and competitively pricing them, and you can track calls on customers and prospects.

With a spreadsheet you can model market behavior under varying price assumptions; track and analyze customers' use of credit and services to estimate market seg-

Illustration: Michael Ng

ment profitability, identify cross-selling opportunities, and target promotions more accurately; and forecast sales of a given product in a particular market or across markets.

Linear programming software can help you optimize allocation of scarce resources such as advertising and promotion budgets, systems personnel, and equipment. With statistical tools or your own statistical routines written into a spreadsheet you can analyze survey results, perform Bayesian analysis of alternative possible outcomes in new product introduction, and segment a market with discriminant analysis.

With graphics software you can vividly portray for senior management such important analyses as budget required, profitability breakdowns, and sales forecasts. With cooperation and interfaces on the mainframe end and communications hardware and software on the PC side, you could download useful data from various bankwide transaction-processing systems.

Almost All-in-One

A powerful integrated package could perform many of the functions in the above laundry list, and anything the program could not do could be handled by transferring data to another package, since each of the integrated packages mentioned provide data-transfer capabilities. A second approach would be to emphasize the database aspect of the task, build the system using a relational database package, and transfer data to an appropriate program as needed for spreadsheet, graphics, or other applications.

To be useful, marketing information must be fresh. While it need not have the precision of accounting data, it does change over time. The software you choose should enable regular updating and maintenance, and a database management system would be most helpful here. Data will be coming from various sources (customer information files, lending or relationship officers, product production areas, demand deposit accounting, commercial loan processing, industry publications) and in different ways (diskette, paper, modem). An easy-to-use but flexible data entry system is essential, and communications and data conversions are highly desirable. Finally, many inquiries against the data will be ad hoc, so the ability to query the data easily would be helpful. The ability to restructure the database is almost essential, since you will think of elements to add as you become more

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familiar with the system and develop additional information sources.

The level of information will be the individual customer (or, in the case of corporations or other businesses and institutions, the individual company or institution). Information about this customer will be of several kinds:

- **Descriptive:** This relatively static information includes name, address, city, state, zip code, industrial classification (SIC code), size by assets or sales.
- **Market positioning:** This is a vague term and the kind of data you will be able to gather from within the bank may be sparse unless a conscious effort has already been made to capture it; the gist of it is to identify each corporate customer with respect to its positioning in its own industry.
- **Customer preferences:** Carefully designed and executed market research surveys may be necessary to answer specific preference-questions; industry sources such as the Greenwich Research Survey provide valuable input.
- **Financial condition:** Balance sheet information that has undoubtedly been captured in the course of establishing and reviewing the relationship, and a quality rating assigned by credit executives.
- **Credit and service products usage:** Which of the bank's products does this customer use, and in what volume? For commercial and institutional customers the list is long and might include various types of direct credit, cash management, account reconciliation, lockbox, coupon and bond collection, securities safekeeping, investment advisory, and others.
- **Balances:** What are the average monthly balances kept by this customer and how do they relate to the level of compensating balances required to pay for products used?

Depending upon the number of customers, you may require automated inputs from at least some of your sources and a hard disk. The hardest part may not be setting up the system but negotiating with various areas of your bank to provide you with the pieces of data you need from them and maintaining the database.

Once you have set up the database and established the means for keeping it up to date, your market information system will enable you to identify which markets contribute most, enhance existing products to better meet the needs of customers, optimize use of advertising media, and target direct mail promotions. These suggestions will start you off. Where you go from there is up to you. ■

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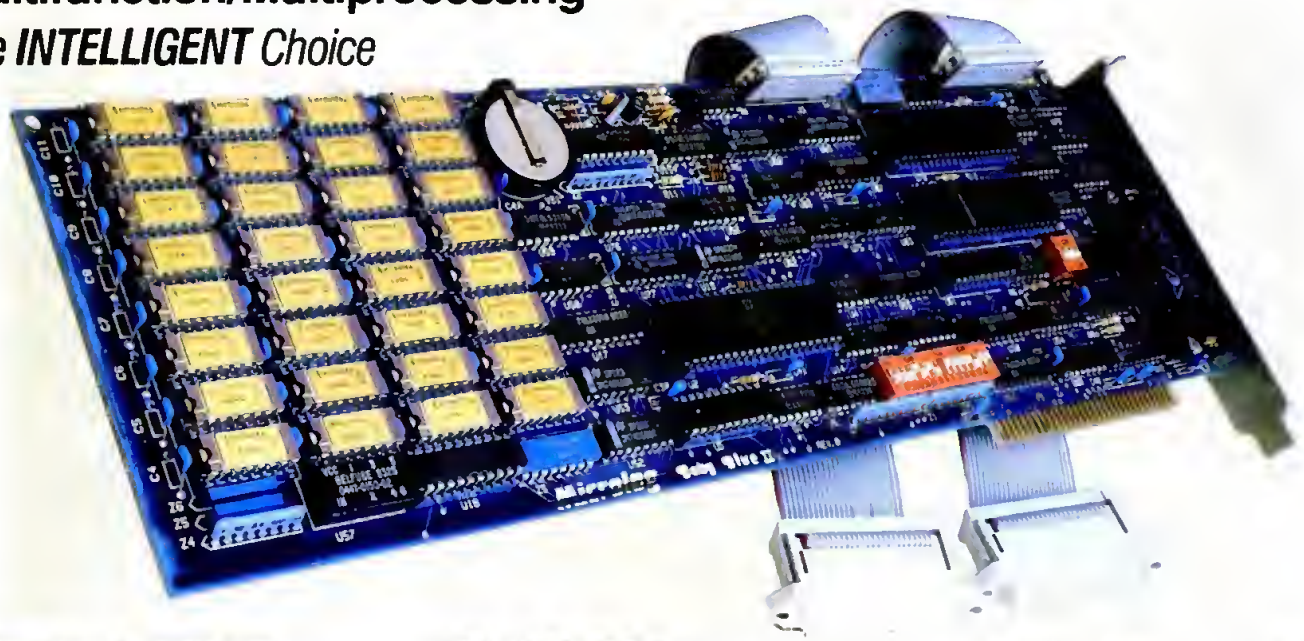

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Courseware Design

Interactive courseware offers some educational options not available with books, pencils, and paper. Well-designed courseware makes the most of these unique opportunities.

When designing or evaluating computer courseware, educators need to consider a number of pedagogical factors that are unique to this medium. As I discussed in a previous issue (see "Courseware Basics," *PC*, Volume 3 Number 16), good educational software should have a well-organized menu system, personalized interaction with the learner, and a discreet, effective way to test the user about what he's learned.

This article offers some tips on courseware aesthetics and diagnostic feedback.

Clean Screens

If courseware is an electronic text, the CRT screen is the equivalent of a printed page. A cluttered display creates distracting visual noise. A good display format is more than just a pretty picture. A well-designed display organizes information in a consistent fashion so the learner's attention will always be drawn to areas on the screen where new information or instructions will appear.

Thus, certain sections of the screen should be reserved for certain kinds of information. A 25-line screen might be divided so that the top 2 lines display a header (title and page information), the middle 20 lines display text, and the bottom 3 lines display function key assignments and other instructions. The central 20-line text area can be subdivided so that questions always appear in the same area. Space within the text area can also be reserved for user input and feedback.

As if to emphasize the unique flexibility of computer-aided instruction, some courseware authors deluge learners with graphics, color, and sound. There's no doubt that special effects can energize dry facts, but, the key is to apply them sparingly and with sensitivity. Like creative people who work with any medium, the author must be able to step away from his work, view it as the audience would, and then be willing to edit it dispassionately.

For example, as positive reinforcement, an author may reward successful completion of a chapter with a burst of *son et lumière*. But how will this play in a ten-chapter lesson? How many times will the learner appreciate an inescapable reenactment of the climax to *2001*?

Flashing text, which blink to attract the learner's attention or to make a point, can backfire in two ways. First, in a machine environment, flashing is often used to indicate danger or caution. As a result, flashing text might agitate the learner. Second, a persistent flashing message is as irritating as an instructor who repeats a direction over and over. Instead of a benign reminder, it might be taken as an insult: "Got it yet, dummy?"

(continued)

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- 1340 777

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- 300 205

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CIRCLE 130 ON READER SERVICE CARD

Interaction and Feedback

Interactive courseware sets up a dialogue between the learner and the program. But computers are far less agile than humans in handling the ambiguities of communication, and thus it takes thoughtful design to manage this interaction.

When examining courseware, note how the program solicits and accepts user input. For example, some programs forgive capital letters, spaces, and punctuation in typed responses; others demand letter-perfect accuracy. In either case, rules governing how an answer should be entered should accompany the question itself.

In courseware, answers can be wrong for several reasons. Not only can they be *factually* wrong, they can also be *technically* wrong—"Washington, DC" may not be recognized as the U.S. capital if the author has stipulated only "Washington, D.C." as a valid answer.

When an answer is incorrect, diagnostic feedback that explains or suggests the possible cause for the error should be given. Some feedback is friendly but cryptic: "Sorry. Try again." Other feedback messages are phrased in language that blames the learner for what is a programming constraint: "Answer too long."

If the problem lies in the machine, more honest messages are appropriate—for example, "This program cannot handle responses longer than 20 letters." If the courseware author can offer more detailed diagnostic information to the learner at this point, a Help or Hint option is useful.

On the other hand, feedback can also be patronizing or embarrassingly cute. Often courseware will enthusiastically congratulate the learner for correctly typing his name ("Fantastic!"). Who is so insecure as to need this much support?

At the heart of the learner–computer dialogue is the computer's ability to evaluate a learner's response. Courseware uses various methods to control learner input and make it easier to judge. One method is limiting the characters the learner can type. For example, a true-or-false question might allow either a maximum of five characters in its answer or a single character ("T" or "F").

Another approach is to partially disable the keyboard and not display characters other than "T" or "F." The courseware should tell the learner if these techniques are used.

The swift judgment of a hair-trigger computer is awesome. No sooner is an answer entered than it is evaluated as right or wrong. This is fine if the learner never makes a typing mistake or has a second thought. But courseware needs to be forgiving of human nature and let learners initiate the judging process. One way of doing this is by inserting an extra step, a Confirm key that the learner can press to signal satisfaction with the answer.

A final point: Answer and feedback should coexist on the same display. It's disconcerting when a computer judges an answer that is no longer on the screen.

The Last Word

There are some indisputable earmarks of mediocre courseware. Look for page turners that require learners to do little but press the Enter key repeatedly, lessons with identical content for every learner, quizzes that never vary in format, and programs that blaze with sound and light but offer little substance.

Just because a lesson has been put on a CRT does not mean it belongs there. Courseware should offer value-added educational activities not easily achieved with books, paper, and pencils. ■

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CIRCLE 531 ON READER SERVICE CARD

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CIRCLE 527 ON READER SERVICE CARD

New On The Market

HARDWARE

Multifunction GPIB Controller

A plug-in board providing a means of controlling IEEE 488 GPIB devices and instruments from the user's system. The board can be connected to up to 15 devices for automated measurement and data acquisition applications.

In addition to its GPIB capability, the board has one programmable interval timer and one parallel port that will accept any one of several optional modules available from the manufacturer. Modules available include A/D and D/A converters, reed relays, and stepper motor controllers.

A separate software package supplies all of the routines needed to implement the board's GPIB functions. Over 30 macro commands permit the user to perform many common applications. The user can use BASIC, assembly, or other programming languages to invoke the application routines.

(List Price: Board, $395; Modules, $75–$495; Software, $100)
Qua Tech, Inc.
478 E. Exchange St.
Akron, OH 44304
(216) 434-3154

CIRCLE 721 ON READER SERVICE CARD

DataPort Letter Quality Printer

A letter quality printer weighing less than 5 pounds, using a five-wheel impact unit capable of bidirectional printing at 15 characters per second. The printer uses a replaceable inking unit that is rated at 100,000 characters.

The DataPort printer's print wheel set can produce the standard 96-character ASCII set in the Elite 12 font, printing 80 columns across on regular 8½-inch-wide typing paper. It incorporates a Centronics-type parallel interface.

(List Price: $295)
DataPort
Computer Products
Research Facility
5525 Olinda Rd., Bldg. A
El Sobrante, CA 94803
(415) 223-3658

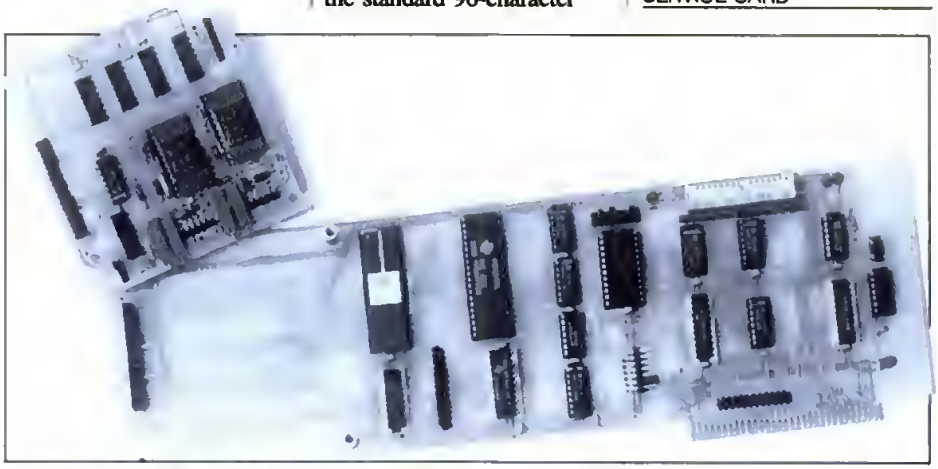
CIRCLE 723 ON READER SERVICE CARD

RGB-1400PC Display, RGB Display Corp.

RGB-1400PC Display

An RGB color display featuring 700-line resolution and the ability to display up to 32 colors simultaneously from a palette of 4,096 colors. The 14-inch CRT includes super-high contrast glass with a nonglare surface.

The internal circuitry of the monitor includes a Fujitsu MB14K series bipolar gate array that permits switching from an application program to built-in color balance calibration and test pattern functions. Provisions have been included to test color purity, red-blue convergence, and red-green-blue convergence. To reach these functions, the user simply activates a "test" switch located on the front panel of the display. Also accessible from front panel controls are color gain, brightness, power on/off, "on command" degauss, and color select from either



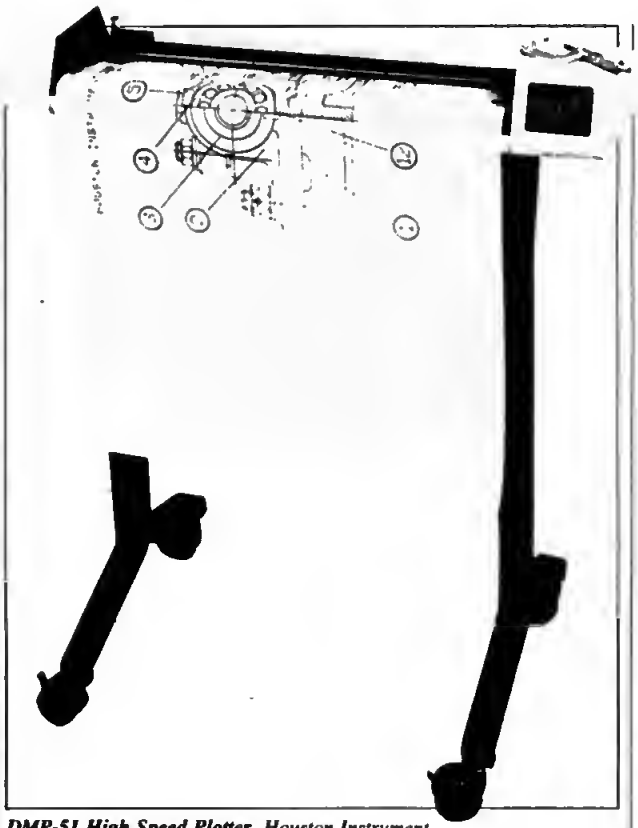
Multifunction GPIB Controller, Qua Tech, Inc.

of two 16-color sets. Color selection is PROM controlled and can be easily changed; chosen colors are displayed in the Test mode.

The design of the RGB-1400PC makes use of a transformerless isolation circuit that reduces the monitor's power, weight, and overall size requirements. Models of the display are available for 16kHz (compatible with IBM's color/graphics board), 24kHz (compatible with Persyst's BoB board), or 31kHz (special CAD/CAM applications) operations.

(List Price: $595)
RGB Display Corp.
22525 Kingston Ln.
Grass Valley, CA 95945
(916) 268-2222

CIRCLE 722 ON READER SERVICE CARD



DMP-51 High Speed Plotter, Houston Instrument

SUPERTELEX PC

An internally mounted 600 bps modem with support software that emulates Telex/TWX network terminals, allowing data transmission through both domestic and international networks. The package features word processing capabilities to format messages with word wrap, text justification, word or phrase search, and so forth. Special message formats can be created and saved to disk for reuse. Included with the text formatter are the required formats for Western Union's Easy-Link electronic mail service.

The modem itself allows automatic dialing and redialing, delayed transmissions, and "refile" capabilities.

(List Price: $695)
Requires: 96K RAM, one disk drive, PC-DOS 2.0, telephone line with RS-11C jack.
American Telecom
16931 Milliken Ave.
Irvine, CA 92714
(714) 863-3000
Telex: 68-5667
TWX: 910-595-1991

CIRCLE 780 ON READER SERVICE CARD

S/COM Cache Cartridge

A 9-track, ¼-inch cartridge tape system with 60 megabytes storage capacity. The unit features a QIC 11/24 recording format and an SCSI interface.

The Cache Cartridge can perform tape-to-disk and disk-to-tape data transfers without user intervention. Data transfers occur at a 90 KB/sec rate without special streaming software.

The utilities are menu-driven with help screens. They can perform selective file read/writes, mirror image streaming dumps, ASCII/EBCDIC code conversions, and reads of foreign formats.

(List Price: $1,995)
Science & Communications, Inc.
352A University Ave.
Westwood, MA 02090
(617) 461-0200
Telex: 92-4473

CIRCLE 717 ON READER SERVICE CARD

DMP-51 High-Speed Plotter

A plotter capable of producing C- or D-sized drawings at a drawing speed of 22 inches per second with a resolution of .001 inch. The unit incorporates 26K bytes of built-in ROM, permitting it to execute complex graphics from software commands.

The DMP-51 plotter is compatible with existing DM/PL software programs. A mechanical/architectural version, the DMP-52, is also available at the same price.

(List Price: $4,495)
Houston Instrument
P.O. Box 15720
Austin, TX 78761
(512) 835-0900

CIRCLE 778 ON READER SERVICE CARD

Enigma Secure Communications System

A point-to-point communications system designed around an internal 300/1200

bps modem with auto dial/auto answer functions, capable of both asynchronous and synchronous SDLC communications. The Enigma system has a network capacity of 64 terminals providing for over 2,000 potential secured links over the public telephone system.

Security features for the Enigma system include hardware-based DES encryption with a dynamic key management process whereby each link in the network has a unique key that automatically changes. This feature is also available for the local encryption of data files. Other security features include local terminal access control, dial back facility, and tamper detection.

(List Price: $1,400)
Enigma Division
Isolation Systems
1631 The Queensway, #6
Toronto, Ont.
Canada M8Z 5Y4
(416) 259-5401

CIRCLE 724 ON READER SERVICE CARD

PCjr Pro-Kit

A multifunction expansion module allowing users of the IBM PC*jr* to expand RAM with up to 512K of additional memory. Pro-Kit comes in its own color-matched case that installs in the PC*jr*'s side I/O connector. In addition to the extra memory, the unit includes an on-board quartz clock/calendar with battery backup and a parallel printer port. Also included is *NO WAIT* software, which allows the expanded RAM memory to function as either a print spooler or as an electronic disk drive.

(List Price: 64K ver., $395; 128K ver., $455)
Requires: IBM PC*jr*.
Prelude Corp.
20380 Town Center Ln.
Cupertino, CA 95014
(408) 257-6033

CIRCLE 718 ON READER SERVICE CARD

PCjr Pro-Kit, Prelude Corp.

RECOUNT 400

A hardware/software package for office expense management. The system consists of a network of small data-entry, collection, and control terminals linked to a PC via a conventional communications interface. The terminals are available in a variety of models featuring key or card entry, numeric only or alphanumeric capability, with or without integral printers. Terminals are also available for positive lockout control of office machines—copies, print machines, DP terminals, and fax machines.

RECOUNT 400, DANYL Corp.

RECOUNT 400 software includes the *TRACER* program that provides tailored menu-driven selection and supervision of all expense management operations. These include remote terminal data collection, transaction validation, and report generation. The system can also do cost extensions, and sorting/preprocessing for transfer to a higher-level host computer.

The RECOUNT 400 system can service up to 12 on-line terminals simultaneously, and any number of others in an off-line, store-and-forward mode. The system's hardware and software are available as separate components for users with existing PCs or as a complete turnkey system with a PC.

(List Price: Complete turnkey system, $11,390)
DANYL Corp.
1509 Glen Ave.
Moorestown, NJ 08057
(609) 234-8000

CIRCLE 777 ON READER SERVICE CARD

Model VP-6801P Plotter

A multiple-pen plotter with functions for programming rotations, circles, zooming, and italics. The VP-6801 uses eight fiber, plastic, or ballpoint pens chosen from a side rack by the drawing arm under software control or in response to front panel buttons.

The VP-6801P Plotter uses an electrostatic field to hold paper to its plotting area of 10 × 7.2 inches. The unit is available with 8-bit parallel, GP-IB, or serial interfaces.

(List Price: $1,565)
Panasonic Industrial Co.
One Panasonic Way
Secaucus, NJ 07094
(201) 348-7183

CIRCLE 719 ON READER SERVICE CARD

Legend 800 Printer

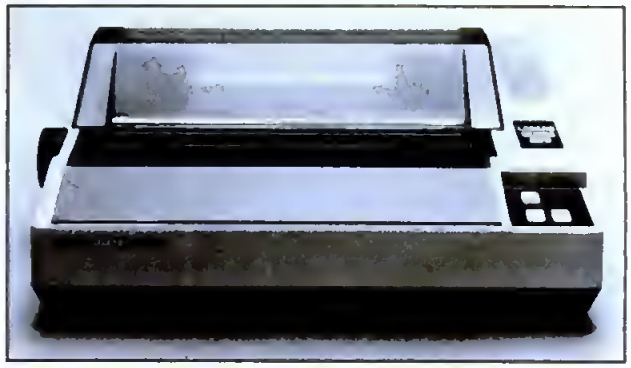
A dot matrix printer capable of bidirectional printing at 80 characters per second. The unit prints a square dot, which results in a highly legible typeface. It can function in alphanumeric, semigraphics, and bit-image graphics modes, featuring 228 ASCII characters in normal and italic fonts, as well as symbols and semigraphic elements.

The Legend 800 can print 80 columns across in normal mode, 40 columns in double width, 142 columns in compressed print, and 71 columns in a double/compressed print mode. Its replaceable print head is rated at a lifetime of more than 30 million characters. The unit is supplied with a Centronics parallel interface.

(List Price: $350)
CAL-ABCO
Peripherals Div.
14722 Oxnard St.
Van Nuys, CA 91401
(818) 994-0909

CIRCLE 720 ON READER SERVICE CARD

Model VP-6801P Plotter, Panasonic Industrial Co.



Legend 800 Printer, CAL-ABCO Peripherals Division

IRE Scrambler

A data-encryption device that provides secure data transfer over common phone lines when used in pairs. Computers equipped with matching devices and modems can communicate with each other free of unauthorized eavesdropping via the Scrambler's DES algorithm.

IRE Scramblers implement the Federal Information Processing Data Encryption Standard (FIPS 46) developed by the National Bureau of Standards. Each set of the devices has its own encryption key and can communicate only with other units in that set. When communications are established between members of the set, automatic session key distribution is performed and the units are synchronized. Null traffic and resynchronization are performed automatically during lulls in communication, so line use patterns are not apparent (a means by which transmission contents might be found out).

The units support full duplex operation at the bps rate of the Scrambler model used. If the high-accuracy mode is selected, an error detection and correction algorithm is performed using a cyclic redundancy check word. If errors are introduced by the telephone system, the data are retransmitted until the check word indicates the data have been correctly received. This mode reduces the effective speed of communications but ensures that the data are delivered correctly.

Two models of the Scrambler are available: SC-12, offering bps rates of 300 to 1200; and the SC-96, offering 300 to 9600 bps.

(List Price: SC-12, $295; SC-96, $495)
Industrial Resource Engineering, Inc.
P.O. Box 57
Timonium, MD 21093
(301) 561-3155

CIRCLE 776 ON READER SERVICE CARD

The Toaster

A hard disk subsystem incorporating two removable 5 megabyte cartridges. The unit's two 3.9-inch cartridges can be removed and replaced while the user's system is in operation. This setup provides the user with unlimited hard disk storage capacity. The drives feature average data access times of 70 milliseconds, formatted storage capacities per cartridge of 5 MB, and an interface compatible with IBM's disk drive controller.
(List Price: $3,495)
XCOMP, Inc.
3554 Ruffin Rd. So.
San Diego, CA 92123
(619) 573-0077

CIRCLE 788 ON READER SERVICE CARD

ThinPrint 80

A battery-powered thermal graphics printer that weighs less than 4 pounds and fits into half the size of an average briefcase. The ThinPrint 80 features bidirectional printing, a full 2048 buffer memory, 80 or 136 characters per line, serial or parallel interfaces, and either single-sheet or roll feeding from an internal paper compartment.

The printer provides a dot-addressable resolution of 960 × 7 dots per line, and can create facsimile-like images of graphs, charts, and digitized pictures. Included in the basic package are rechargeable batteries, A.C. adapter, and an 80-page roll of paper.
(List Price: $279)
Axonix Corp.
417 Wakara Way
Salt Lake City, UT 84108
(800) 821-7093
(801) 582-9271

CIRCLE 789 ON READER SERVICE CARD

SOFTWARE

R WORD

A word and file processing system consisting of integrated programs for word processing, mail merge, table math, spelling, and database management functions.

To simplify document organization, a three-level file structure is utilized, containing 9 directories with 32 categories in each directory, and 32 documents in each category. The software allows basic typing and filing tasks, as well as the production of more complicated documents with headers, footers, tables, and footnotes. Six editing modes are available to the user, including text, word, sentence, line, paragraph, and page. *R WORD*'s color monitor support facility combines eight different color choices to use as background, reverse video, underlined or highlighted text.
(List Price: $395)
Requires: 256K RAM, one disk drive, PC-DOS.
R Systems, Inc.
11450 Pagemill Rd.
Dallas, TX 75243
(214) 343-9188

CIRCLE 792 ON READER SERVICE CARD

R WORD, R Systems, Inc.

LABCODE-QC

A statistical quality control program that can produce such control charts as p, c, X-bar, range, cusum, and other Shewhart-type charts. Up to 12 different sets of data can be plotted simultaneously, including the calculation of parameters such as the arithmetic mean, standard deviation, and minimum and maximum values. Data outside control or warning limits are immediately identified upon entry. Automatic trend analysis is also included.

Graphics, statistics, and data entry/editing facilities are integrated into the single system. User-defined equations can be set up within a data table to eliminate the need to do any calculations by hand and to minimize keystrokes. Function keys are labeled on screen, and help screens are available to simplify learning the system.

In addition to the main *QC* program, the system includes programs to create new data file formats, build custom help screens, and arrange graphs into slide show presentations.
(List Price: $380)
Requires: 192K RAM, two disk drives, PC-DOS, color/graphics adapter.
Granada Systems Design, Inc.
303 Fifth Ave.
New York, NY 10016
(212) 686-6945

CIRCLE 779 ON READER SERVICE CARD

Castle Wolfenstein

A new version of the adventure game program for use with the IBM PC and PC*jr*. The player assumes the role of a captured WWII G.I. who has been taken to an ancient castle behind enemy lines for interrogation. Armed only with a smuggled pistol and ten bullets, the player battles guards and stormtroopers to find Nazi war plans and escape from the castle. By searching vanquished guards, the player can acquire extra ammunition and keys to doors and footlockers containing grenades, uniforms, and bullet-proof vests.

(List Price: $29.95)

Requires: 64K RAM, one disk drive, PC-DOS 2.x.

Muse
347 N. Charles St.
Baltimore, MD 21201
(301) 659-7212

CIRCLE 726 ON READER SERVICE CARD

PC STATISTICIAN

A general statistics program incorporating a database management facility. The software permits commonly used statistical analysis functions to be performed within its database files. Users can readily design files, then count, search, sort, review, and edit with a set of step-by-step instructions. Other easily performed functions include ranking, indexing, and file transformations. Advanced users with large data files can get automatic random sampling of data for further analysis.

PC STATISTICIAN also offers the graphics options of data set plots, bar graphs, scatter plots, and curve-fitting. Graphics can be produced on-screen, saved to disk, or printed out using Epson or C. Itoh dot matrix printers.

(List Price: $300)

Requires: 128K RAM, two 320K drives, PC-DOS 2.0.

Human System Dynamics
9010 Reseda Blvd., #222
Northridge, CA 91324
(213) 993-8536

CIRCLE 788 ON READER SERVICE CARD

PC CYLAW

A law office management program designed for small to medium-size law firms. Features include time and disbursement accounting; general ledger, client billing, and accounts receivable; calendar and docket control; and the ability to produce a range of management reports.

PC CYLAW's built-in database facility permits the user to establish a custom database for staff, client, matters, disbursement types, adjustment types, billing rates, and activity categories. As many client matters as required can be entered, as the only limit to the size of a database is disk capacity.

Each of the software's integrated accounting modules can operate independently, sharing and updating data as needed within the other modules. Management reports made possible by the software include Billing and Payment History, Client Time and Payment Analysis, Activity, Unbilled Time, and a Delinquent Time Slip report. Additional reporting features are built into the database management component.

(List Price: Complete System, $2,700)

Requires: 128K RAM, two disk drives, PC-DOS 2.0.

Cybernetics Resource Corp.
10 Maple St.
Pt. Washington, NY 11050
(516) 883-7676
(212) 961-4307

CIRCLE 790 ON READER SERVICE CARD

Printer Basher

A printer utility program providing menu-based operation of the control functions and print modes of Epson printers. The software also can download (into the Epson FX) three IBM character sets not normally found in the printers, including two graphics sets.

To operate the program, the user calls up the menu and selects printer mode and functions. On Epson printers, the selection of certain print modes makes other modes unavailable. *Printer Basher* indicates such conflicts on-screen, allowing the user to "browse" for acceptable combinations. It also refuses to permit the user to make impossible combinations of modes. When the printer has been set up, the software retires until called again.

(List Price: $59.95)

Requires: 64K (PC-DOS 1.1) or 128K RAM (DOS 2.0), one disk drive, Epson printer.

Connecticut Software Division
Speer Research Corp.
30 Wilson Ave.
Rowayton, CT 06853
(203) 838-1844

CIRCLE 793 ON READER SERVICE CARD

QUIZ

A test/quiz authoring program that can help the user create true/false, multiple choice, exact answer, and short answer questions. Students can take the prepared quizzes on the computer (student scores are saved to disk), or the quiz can be printed for classroom group testing.

QUIZ can also prepare alternate quiz forms, each form with its own key.

(List Price: $139.95)

Requires: 128K RAM, one disk drive, PC-DOS.

Diversified Educational Enterprises, Inc.
725 Main St.
Lafayette, IN 47901
(317) 742-2690

CIRCLE 787 ON READER SERVICE CARD

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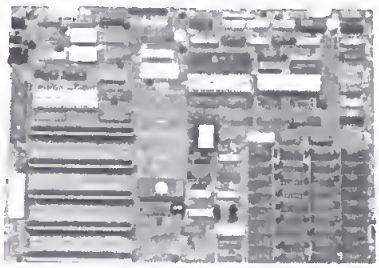

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DYNAX DX-15 13 cps	$450
BROTHER HR-1 16 cps	$599
BROTHER HR-25 23 cps	$749
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I/O PLUS-1s, 1p, c	$190

PERIPHERAL CARDS

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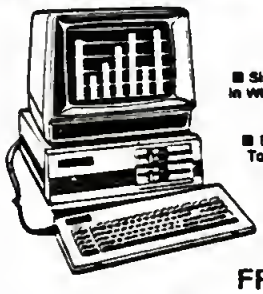

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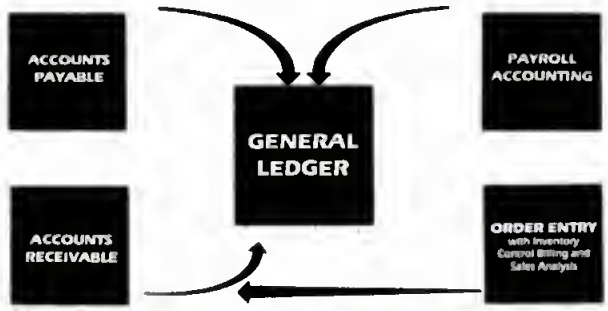

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(List Price: $795)

Requires: 64K RAM, two disk drives, PC-DOS, color/graphics adapter, graphics printer.

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420 Lexington Ave., #2846
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(800) 221-2114
(212) 878-9640

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A COBOL compiler that allows IBM mainframe VS COBOL programs to be compiled and tested on an IBM PC. The software allows programmers experienced in VS COBOL to use the PC for new program development without costly retraining.

Realia COBOL compiles at high speed using several optimization techniques to generate efficient code. Typical compilation speed ranges from 700 to 1,500 lines per minute on a floppy disk, 1,200-1,600 lines per minute on a hard disk. It accepts ANSI 74 COBOL with extensions derived from VS COBOL. Structured programming facilities from the proposed NASI COBOL standard have also been included.

Other features include a cross-reference listing, an expanded code listing, a symbolic debugger, and a nonlicensed run-time library of functions.

(List Price: $995)

Requires: 160K RAM, two disk drives, PC-DOS.

Realia, Inc.
10 S. Riverside Pl.
Chicago, IL 60606
(312) 346-0642

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Project, Microsoft Corp.

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The built-in reporting facility can generate and print predefined reports, and specific reports detailing activi-

GCLISP, Gold Hill Computers, Inc.

ty and project status including early/late start dates and resource requirements/costs. Reports can also be transferred to outside programs such as *Multiplan, Chart,* Lotus' *1-2-3,* and *dBASE II*.
(List Price: $250)
Requires: 128K RAM, one 320K drive, PC-DOS.
Microsoft Corp.
10700 Northup Way
Bellevue, WA 98004
(206) 828-8080

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Monitor-based model P2 offers five outlets and is designed to fit under a standard-sized monitor.

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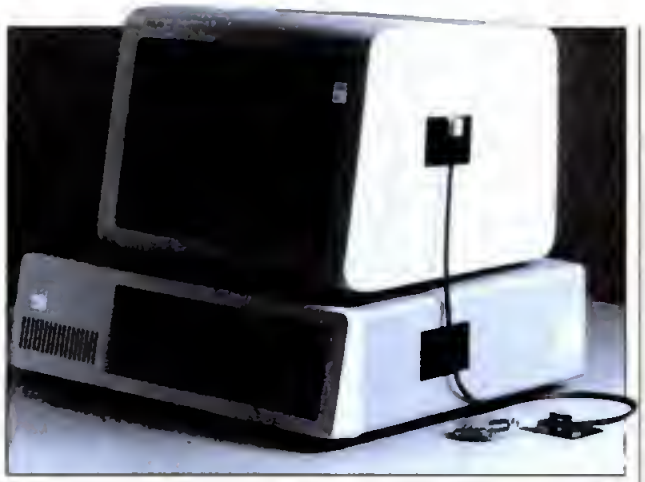

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(List Price: $24.95)
Vikor Co., Inc.
55 Lake St.
Nashua, NH 03061
(603) 889-8530

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strengths and weaknesses of the programs being considered.
(List Price: $11.95)
Howard W. Sams & Co., Inc.
4300 W. 62nd St.
Indianapolis, IN 46268
(317) 298-5400

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A Guide to Accounting Software for Microcomputers is organized with a 90-page discussion of the systems selected for review, 12 pages of features analysis comparing each system by functional areas covered, and 35 pages of detailed comparative charts covering all elements of the master files, all transaction components, audit trail support, and reports. At a more general level, there is also an

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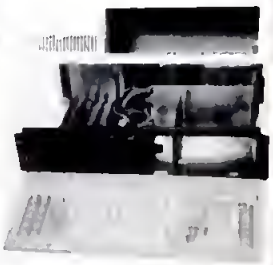

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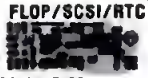

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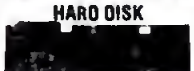

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(205) 281-6100

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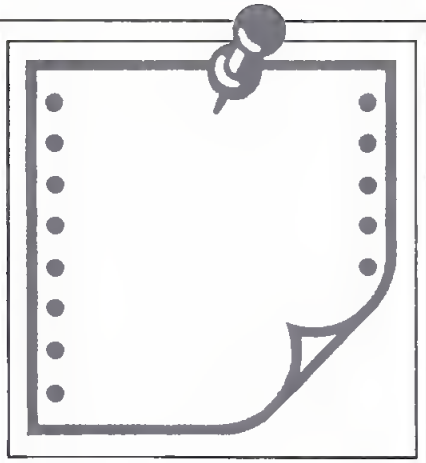

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Palo Alto, CA 94305

San Diego Computer Society
c/o John Field
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(619) 421-9686

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7255 Orchard Dr.
Gilroy, CA 95020

Modesto-Turlock IBM PC User Group
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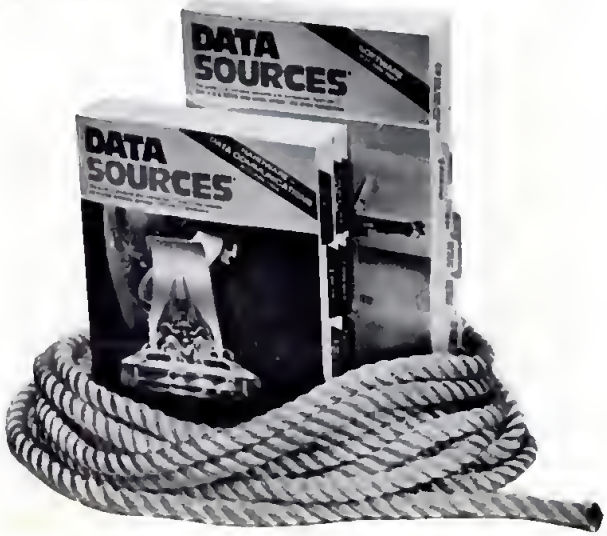

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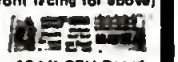

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Writing In dBASE II

Here are two useful programs to help you harness the power of dBASE II for specific applications.

In last issue's Programming column, "Tips on dBASE II" (*PC*, Volume 3 Number 16), I described some techniques to use when writing *dBASE II* command files. This issue's column will continue that discussion and provide instruction on how to automatically invoke a command file. It also includes an extended program for unloading comma-delimited databases from *dBASE II* to programs such as *MailMerge*.

Automatically Executing a Command File

My firm, Darwin Systems, Inc., runs *dBASE II* applications on a variety of machines that operate under CP/M-80 and PC-DOS/MS-DOS. Our CP/M-80 machines do not have an internal clock/calendar, but we require that all DBF files be stamped with a date that correctly corresponds to the last update. Our solution is to automatically execute a command file, DATE.CMD, that ensures that the system date has a valid value any time *dBASE II* is invoked. (DATE.CMD is itself an interesting program that retains the system date until the machine is turned off, regardless of how many times a user goes in and out of *dBASE II* during the day.)

To make *dBASE II* automatically execute a command file on invocation at the operating system level, all we have to do is place the name of the command file at a memory location beginning at 80H and put a JMP instruction at the beginning of DBASE.COM to the short routine that places the command file name at 80H. In Version 2.4, *dBASE II* starts off with a JMP 46C9 instruction; we replace this with something like JMP 4D00, and at 4D00 patch in a routine that places the name of the command file at a memory area beginning at 80H. This routine should end with a JMP 46C9 instruction.

Illustration: Michael Ng

The patch is done with DDT. If the command file we want to execute automatically is DATE.CMD, the steps are as shown in Figure 1.

Automatic execution of a command file is also useful for end users who want *dBASE II* to execute one (and only one) command file. For example, a user who wants *dBASE II* to execute TRAV-

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dBASE II to MailMerge

This discussion would not be complete without tackling the subject of passing data from *dBASE II* to *MailMerge* and other software. Some programmers suggest using the COPY TO .. SDF DELIMITED WITH command and then either using *WordStar*'s global find-and-replace facility or a BASIC program to get rid of trailing blanks. This was necessary in earlier versions of *dBASE II*, but Version 2.4 works without any additional effort. The command

```
COPY TO<filename>
   SDF DELIMITED WITH"
```

unloads the database records correctly without trailing blanks, and it can be used directly by *MailMerge* and others without any massaging.

The program that appears in Figure 2, DB2MM.PRG, uses this command and other *dBASE II* trickery. The program is a general one that allows the user to do the following:

- specify the name of the DBF file (the program then obtains the file's fields via the COPY STRUCTURE EXTENDED command);
- select any or all fields of the database to be included in the *MailMerge* file;
- specify a set of selection criteria so that only those records satisfying the criteria will be included. To guide the user in formulating the criteria, a brief example is given and a list of all character and numeric fields in the database are shown on the screen.

The DB2MM.PRG program includes various error traps which were inserted to prevent an abnormal termination. These error traps include the FILE function to check for the existence of the specified DBF file, and the TEST function to test for

```
A>ddt dbase.com
DDT VERS 2.2
NEXT  PC
4D00 0100
-a100
100 jmp 4d00
103 jmp 46c9      <-- not really necessary but it doesn't hurt
106 .
-a4d00
4D00 mvi a,04     <-- 4=# chars in CMD filename ("DATE" has 4)
4D02 sta 80
4D05 mvi a,44     <-- HEX for letter "D"
4D07 sta 81
4D0A mvi a,41     <-- HEX for latter "A"
4D0C sta 82
4D0F mvi a,54     <-- HEX for letter "T"
4D11 sta 83
4D14 mvi a,45     <-- HEX for letter "E"
4D16 sta 84
4D19 mvi a,00     <-- pad remainder with nulls
4D1B sta 85           just
4D1E sta 86           to
4D20 sta 87           be
4D23 sta 88           sure
4D26 jmp 46c9
4D29
-g0
A>save 77 dbase.com
```

Figure 1: *The listing for the DDT patch that makes* dBASE II *automatically execute a command file. All user input is in lower case. Author's commands are on the right separated by arrows.*

the validity of the selection criteria.

The program also illustrates one way of writing command files: all *dBASE II* keywords are in uppercase, while all others (memory variables, field names, filenames) are in lowercase. IF-ENDIF and DO-ENDDO blocks are indented—I always try to mark ENDIF/ENDDO statements with identifiers to indicate which blocks they are ending.

With the tips contained in this article and its predecessor, writing *dBASE II* runtime applications ought to be much less confusing. ■

```
IF f

  DB2MM.PRG   (c) 1983  Darwin Systems, Inc.

  AUTHOR:  P. L. Olympia, Ph.D.   -12/10/83-

  PURPOSE: General system for convarting dBASE II data into a format
           usable by MailMerga, DataStar and othars

  FEATURES:
        o No limit on tha number/langth of fialds to be convarted
        o Usar specifias DBF fila during run-time
        o User can specify aoy or all fields contained in the DBF file
        o Usar can spacify salaction critaria that records muat satiafy
          for thair fielda to ba included
        o Built-in arror traps via FILE and TEST function to prevant
          abnormal terminstion.


  NOTES:
        o COPY STRU EXTE TO filaname will craata "filanama" whosa racords
            are the fialds of tha DBF in use

        o Varsion 2.4 of dBASE II allows the
                COPY TO <filename> SDF DELI WITH "  command
          to unload a data base with trimming of trailing blanka

ENDIF f

CLEA
SET TALK OFF

*  Defina memory variablea
STOR ' ' TO mdr1,mdr2
STOR '        ' TO mdbf,mm
STOR CHR(7) TO ball
STOR "," TO comma

STOR F TO ok
DO WHIL .NOT. ok

 ERASE
 @  1, 0 SAY "================================================"
 @  1,50 SAY "=============================="
 @  2, 0 SAY "DB2MM - dBASE II to MailMerge Conversion Program"
 @  2,52 SAY "(c) 1983  Darwin Systems"
 @  3, 0 SAY "================================================"
 @  3,50 SAY "=============================="
 @  5, 0 SAY "Name of dBASE II DBF File to convart ----------"
 @  5,50 SAY "--->"
 @  5,56 GET mdbf PICT '!!!!!!!!'
 @  6, 0 SAY "Driva Lettar (a.g., A, B) containing above file --"
 @  6,50 SAY "--->"
 @  6,56 GET mdr1
 @  9, 0 SAY "Name of MailMerga (.TXT) fila to write to --------"
```

(continues)

Figure 2: *The source code listing for DB2MM.PRG, a program to download data from* dBASE II *to* MailMerge.

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```
 @  9,50 SAY "--->"
 @  9,56 GET mm PICT '!!!!!!!!'
 @ 10, 0 SAY "Drive Letter for the MailMerge File  ------------"
 @ 10,50 SAY "--->"
 @ 10,56 GET mdr2
 @ 12, 0 SAY "=============================================="
 @ 12,50 SAY "============================"
 @ 13, 0 SAY "NOTE: If drive letter is left blank,"
 @ 14, 6 SAY "default drive is assumed"
 READ

*  Formulate filenames
 IF mdr1 # ' '
   STOR mdr1+':'+mdbf TO mdbf
 ENDIF mdr1

 IF @('.',mm)=0
    STOR mm-'.TXT' TO mm
 ENDIF mm ctns colon

 IF mdr2 # ' '
   STOR mdr2+':'+mm TO mm
 ENDIF mdr2

*              Check if DBF file exists
 IF .NOT. FILE(mdbf)
   ? bell+'File '+mdbf+'.DBF'+' does not exist'
   ?
   ? 'Press <ESC> to abort ... any other key to try again ... '
   WAIT
 ELSE
   STOR T TO ok
 ENDIF

ENDDO not ok

RELE mdr1,mdr2
USE &mdbf
COPY STRU EXTE TO temp
USE temp

*    The records of TEMP is the structure of mdbf
*    Show the fields snd ask which ones to include
STOR 2 TO mline
STOR 0 to numfld
STOR ' ' TO mfldlst,allvar
ERAS
 @ 1,1 SAY '     FIELDNAME  TYPE  LENGTH  (Mark fields to be included with Y)'

 DO WHIL .NOT.EOF

   STOR 'N' TO minclud

 IF field:type$'CN'

  @ mline+#,1 SAY STR(#,2)+'.   '+field:name+'  '+field:type+'   '+;
                STR(field:len,3)+'   Include? (Y/N) -->' GET minclud PICT '!'
  READ
  IF allvar > ' '
    STOR allvar-comma-field:name TO allvar
  ELSE
    STOR TRIM(field:name) TO allvar
  ENDIF allvar

   IF minclud='Y'
      IF mfldlst > ' '
        STOR mfldlst-comma-field:name TO mfldlst
      ELSE
        STOR TRIM(field:name) TO mfldlst
      ENDIF mfldlst
```

(continues)

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```
    ENDIF minclud=Y

  ENDIF fieldtype is C or N

   SKIP
  *  Check if the screen is full
   IF #=22
      ERAS
      STOR -19 TO mline
   ENDIF 22th line

   ENDDO not eof


*  Ask for selection criteris
   USE &mdbf
   STOR ' ' TO sel
   ERAS
   STOR N TO ok
   TEXT

     You may impose any selection criteria to preselect any
     records that should be included in the MailMerge file.

     An example of a selection criterion is:

        NAME >='A' .AND. NAME <='B'

     where "NAME" is a field in the data base. This criterion will
     select only those records with Names beginning with A or B.


   ENDTEXT
   WAIT
   STOR N TO ok

   DO WHIL .NOT. ok

     ERAS
     INPU 'Do you want to impose selection criteria? (Y/N)' TO oksel

   IF oksel
     ?
     ? 'Your field names are as follows:'
     ? '   '+allvar
     ?
     ?
     ACCE "Enter criteria: " TO sel
*  Check if this is good
     IF  TEST(&sel)=0
       ? bell+sel+'  is an invalid selection criterion'
       ? 'Press any key to continue...'
       STOR ' ' TO sel
       WAIT
     ELSE
       STOR Y to ok
       STOR ' FOR '+sel TO sel
     ENDIF not test
   ELSE
       STOR Y to ok
   ENDIF oksel
  ENDDO not ok

*  Write the file now
  COPY TO &mm DELI WITH " FIELD &mfldlst &sel

  ?
  ? '++++ All Done. MailMerge file '+mm+' has been created +++'
  RETURN
```

(end program listing)

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1 Please indicate which of the following microcomputers you currently own and/or plan to buy in the next 12 months.

	Own	Plan to Buy
IBM PC	A	G
IBM XT	B	H
PC*jr*	C	I
3270 PC	D	J
XT/370	E	K
Other (specify)	F	L

2 For what, if any, business application(s) do you use the microcomputer you currently own?_____

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3270 PC	D	J
XT/370	E	K
Other (specify)	F	L

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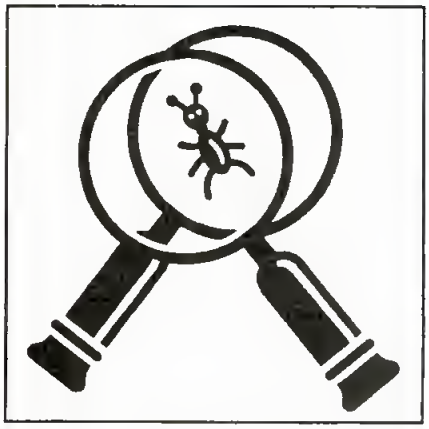
EDITED BY PAUL SOMERSON

User-to-User

PC readers use this forum to help one another by passing along their questions, solutions, comments, and complaints.

The following letters all contain hints and tips about 1-2-3. PC *thanks* 1-2-3 *expert David Hoffman for his help in evaluating these letters. Hoffman is president of Abacus Productions, Inc., a New York City*



firm that provides production and consulting services to the motion picture industry. The comments that follow are his.

Print Macros for 1-2-3

Since I first started working with macros for printing with Lotus' *1-2-3*, I have intended to set up a list showing the available print fonts and their associated control codes. I have finally taken the time to do it and the response has been so good I thought your readers might like to have a copy (see Figure 1).

A word of explanation: I realize some of the control codes don't require the Escape (ASCII 027) code (the ASCII 015 control code, for example); however, using it doesn't affect the string, and, especially for the beginner (or for the user who doesn't use control codes that often), it is easier just to put it in front of everything.

I have also included a copy of the macro I used to print the font list. Many of my business associates now using the list find it to be a good reference in writing their own programs.

The list was not intended to be all-inclusive. In fact, as soon as I printed it, I thought of more that could have been added, but it's enough to get started.

Ed Scott
Huntington Beach, California

Though I don't quite agree with the logic of using unnecessary Escape characters (a few extra ASCII 027s don't make weird numbers any less weird), this is a job that needed to be done and it's nice to have it all in one place. Enter these magic codes while using an Epson/IBM dot matrix printer and the /Print Printer Options Set-up command.

Recalculation Beeps

I have several very large worksheets with

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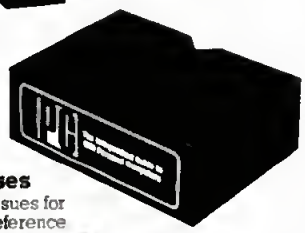

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USER-TO-USER

numeric calculations set up on Lotus' *1-2-3* and on which a recalculation takes several minutes. In order to start recalculation and leave the machine unattended, I need to know when the recalc is done so I can return to work. I discovered this trick: After starting the recalculation, press the Home key, then PgUp five or six times. The buffered keyboard saves everything subsequent to recalc until that is done, and then executes Home and PgUp. Since the cursor is moved to the top of the worksheet by Home, the PgUp causes *1-2-3* to beep, thus notifying you that the recalculation is finished.

Peter Fox
Chattanooga, Tennessee

Good trick, I use it all the time myself.

System Disk Trick

Here is a tip for users of Release 1A of *1-2-3* on hard disks who do not like to get out their system disk each time they boot *1-2-3*. The trick does not work if you load the Lotus Access System before loading *1-2-3*. From the DOS prompt (or in your AUTOEXEC.BAT file) simply type:

```
123
```

and hit Enter. When the *1-2-3* copyright notice appears, place a blank, unformatted diskette into the A: drive and press any key. The blank *1-2-3* spreadsheet appears and away you go. This saves wear and tear on your system disks.

Steve Smiley
Gainesville, Florida

*My tests show this worked with Lotus Access System as well, though not at all with versions of 1A marked with an * on their copyright page.*

Multifile Macros

Spreadsheet users can work on two or more files interactively by adding a simple keyboard macro to each file.

The *1-2-3* example shown here uses two files: FILEA and FILEB. The macro added to FILEA is

```
/FSFILEA~R~/FRFILEB~~
```

When this macro is invoked, FILEA is

```
/ppa
rA1..B5~        Double Width Mode
os{esc}
\027\064\027\087\001~
qq
rA6..B9~        Double Width OFF
os{esc}
\027\087\000~
qq
rA10..B13~      Double Width Emphasized
os{esc}
\027\064\027\087\001\027\069~
qq
rA14..B17~      Emphasized Mode OFF
os{esc}
\027\070~
qq
rA18..B21~      Double Width Italic
os{esc}
\027\064\027\087\001\027\052~
qq
rA22..B25~      Regular Emphasized
os{esc}
\027\064\027\069~
qq
```

(continued)

Figure 1: *Macros to produce various type styles on Epson/IBM dot matrix printers.*

(continued)

```
    rA26..B29~    Italics
    os{esc}
    \027\064\027\052~
    qq
    rA30..B33~    Compressed
    os{esc}
    \027\064\027\015~
    qq
    rA34..B37~    Compressed Italic
    os{esc}
    \027\064\027\015\027\052~
    qq
    rA38..B41~    Double-Width Compressed
    os{esc}
    \027\064\027\087\001\027\015~
    qq
    rA42..B45~    Subscript
    os{esc}
    \027\064\027\083\001~
    qq
    rA46..B49~    Italic Subscript
    os{esc}
    \027\064\027\052\027\083\001~
    qq
    rA50..B53~    Underlined Subscript
    os{esc}
    \027\064\027\045\001\027\083\001~
    qq
    rA54..B57~    Compressed Subscript
    os{esc}
    \027\064\027\015\027\083\001~
    qq
    rA58..B61~    Compressed Italic Subscript
    os{esc}
    \027\064\027\015\027\052\027\083\001~
    qq
    rA62..B65~    Compressed Italic Underlined
    os{esc}
    \027\064\027\015\027\052\027\045\001~
    qq
    rA66..B69~    Printer RESET  (includi g Top of Form)
    os{esc}
    \027\064~
    qqq
```

(Figure 1 ends.)

saved and FILEB is retrieved.

FILEB has the macro

```
/FSFILEB~R~/FRFILEA~~
```

which saves FILEB and then retrieves FILEA.

More than two files can be used by adding macros to direct the retrieve to the specific file.

Robert L. Novak
Chesapeake, Virginia

The R snuggled between two tildes in the middle of these macro lines stands for **R***eplace; you must* **S***ave the files prior to executing the macro, or you will be left with an extra* **R** *somewhere.*

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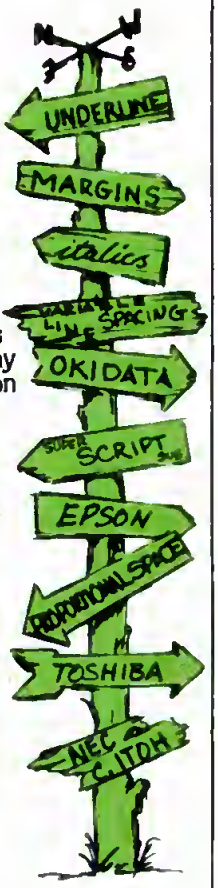

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MARK ZACHMANN

PC Tutor

PEEKing at Ports

Q: I have three questions, all involving BASIC.

1. My system has a dot matrix printer connected to parallel port 1 and a plotter connected to parallel port 2. Is there any way I can use BASIC to direct output to a particular parallel port?

2. Is there a BASIC routine that checks if the printer is on-line?

3. I recall seeing a BASIC routine for toggling the NumLock key on and off. Could you provide a listing of it?

Gary Swindell
Bridgeport, Texas

A: *The solution to each of your questions involves examining the IBM BIOS' dato areo at hexadecimal address 400. (In BASIC's DEF SEG statements, remember that the last zero is omitted, so this address is written as &h40.)*

1. In order to switch between your printer and plotter at the different parollel ports, you need to change the internal pointers for the hard-copy devices. The following routine switches the two pointers around:

```
10 DEF SEG=&h40
20 REM  the BIOS data area
30 FOR J=8 TO 9
40     I = PEEK(J)
50     POKE J, PEEK(J+2)
60     POKE J=2, I
70 NEXT J
```

The two pointers are located at 0040:0008 and 0040:000A. Each pointer is 2 bytes long. Each time this routine is run, the first pointer toggles between 0 and 188, while the second pointer toggles between 0 and 3.

2. To check if the printer is on-line, you need to examine the status bits from the parallel printer port. Normally, it's better to ask the BIOS for the status or to trap BASIC messages regarding the printer, but if you must check the port directly, try the following routine, which examines the LPT1: port.

```
10  DEF SEG=&h40
20  PORTX = PEEK(8)+256*PEEK(9)
30  REM for printer 1
40  STATUS% = &h80 AND INP(1+PORTX)
```

If STATUS% is not 0, then the printer is on-line.

3. To check the status of the NumLock key, use o similar subroutine. There's a byte at 0040:0018 with information on which shift keys are currently depressed. Another byte, at 0040:0017, describes which shift keys have been toggled. To find out whether the keyboard is in NumLock mode, use this routine:

```
10 DEF SEG=&h40
20 TOGGLE% = PEEK(&h17)
30 IF (TOGGLE% AND &h20) THEN ...
```

The IF statement in line 30 is true if the NumLock key has been pressed.

If you want to check on the status of other toggling keys, you can examine the relevant bits by using the following hexadecimal values where &h20 appears in line 30:

```
80  Ins key
40  CapsLock key
20  NumLock key
10  ScrollLock key
```

I find it amusing that IBM devoted a bit to show the status of the ScrollLock key even though it does absolutely nothing as a toggle in the PC operating environment. I wonder why this key wasn't actually used to halt scrolling of the display?

Uneven Spacing

Q: When I use my Silver-Reed EXP 550 printer with *WordStar*, I notice problems with extremely uneven spacing between characters. Also, characters do not align from one line to the next. I know the printer is capable of better results than this, because it spaces words perfectly when I run Lotus' *1-2-3*.

The installation program for Version 3.3 of *WordStar* doesn't list my Silver-Reed printer; MicroPro suggested I install it like the Diablo/Xerox 1610 printer. Is there another way to install *WordStar* so that characters will print out with even spacing?

Barbara Carlson
New York, New York

A: *The problem probably involves microspacing. Many word processing programs take complete control of a printer, even to the point of adding tiny spaces between characters and words.*

To deactivate the microspacing, try installing the Silver-Reed as a printer with no special features, an option that's sometimes called the "vanilla" printer. This is probably the way 1-2-3 *treats your printer, and, if you like those results, you should find* WordStar *will do the same.*

Lagging Memory Chips

Q: I have a PC-1, IBM's early model PC that holds only 64K RAM on the system board. I've added a 256K memory board, which raises the available memory to 320K, and now use DOS 2.1. I have several questions relating to my system's additional memory.

1. The add-on memory board originally had 64K. Later I installed 192K worth of RAM chips. I remember you once cautioned users to get Mostek's 4164 memory chips with 200 nanosecond (200 ns) response. My local distributor sells Mostek 4164-300 chips. When I told him I needed 200-nanosecond chips, he claimed that the "300" suffix was Mostek's code for its 200-ns chips. This labeling seemed implausible, but I bought the memory anyway. Did I get the right chips—or did I get taken?

Many word processing programs take control of a printer, even to the point of adding spaces between characters.

2. If the 4164-300 chips aren't as fast as 200 ns, what problems might arise with them in my system? I have used them for about a year with no sign of problems—until recently. I started using a word processing program that can use more than 128K. When I use this program with long files, there seems to be a significant delay between when I press a key and when the character appears on the display. The program's maker told me I'd be sent a faster, new version, so the problem might be caused—and solved—by software. But could this time lag be due to slower memory chips?

3. I recently purchased Lotus' *1-2-3*, a program that can use more than 128K. After I spent several hours working on a file, I tried to save it, but the program was interrupted by a "Parity Check 2 Error"—and I lost the file. I never had a parity error before. Perhaps this and other recent problems occurred because I'm only now using memory blocks greater than 128K and starting to tap the 192K of suspect chips. Was the parity error a tran-

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PC TUTOR

sient problem, or is it directly related to the chips?

4. I'd like to add another memory card to bring the PC's memory up to the maximum, but I've heard conflicting reports of what the maximum possible RAM is in a PC. The exact amount seems to depend on such things as whether the machine is a PC-1 or a PC-2 and which version of DOS is used. Is there a simple way to tell how much memory I can install?

Glen Nichols
Westlake Village, California

A: *I'll treat your questions in order.*

1. Many chip manufacturers use a numeric code that indicates the relative speed of different models of the same IC. A chip with the suffix −1 is the fastest, −2 is the next fastest, and so forth. Mostek, however, seems to buck that trend. According to listings in IC Master/IC Update *(published by United Technical Publications, Inc.), Mostek identifies its 4164-20 as a 200-nanosecond chip. IC Master didn't even list a 4164-300, but my guess is that the chips you were sold are rated as only 300 nanoseconds. To find out if your chips aren't up to the PC's standards, try running a good memory test program, such as the one on IBM's Diagnostic disk. (The memory check that the PC performs at power-on is a more primitive test that is designed to detect hardware failures rather than dynamic errors that would reveal slow response times.)*

2. If the chips are not fast enough, you can expect sporadic parity check errors, but programs will run at full speed. Program speed is a function of the IBM PC's clock speed, which isn't related to the response speed of memory chips at all. Memory chip speed refers to the maximum time a chip needs to respond to a request for data. If a chip can't respond fast enough, the data stored in it will be inaccurate and the PC will detect a parity error. (Computers that don't use the parity bit, such as the Eagle PC, won't stop to indicate a parity error—they run until you notice that some numbers in a spreadsheet are wrong or that improper instructions cause a program to crash.)

3. It sounds as if you've uncovered the problem with your extra memory by running Lotus' 1-2-3. You're finally making use of the inferior chips in higher memory.

4. Yes, the maximum possible memory does depend on what model of IBM PC you use and which version of DOS you run. In terms of hardware, the limit is 704K because segment 0B000 is reserved for the IBM Monochrome Display Adaptor: 0B000 hex = 704 decimol (11 × 64). The amount of memory that you can put to work can be greater, however, by using bank switching.

Some programs can't support the full 704K—for example, a bug in early versions of DOS causes DISKCOPY to gag on a system with more than 512K.

On the PC-1, there's no way to indicate that more than 576K is installed, so it's unlikely that most programs will be able to use more than that on your machine. Some RAMdisk programs do search for additional memory on the PC-1; since extra memory is usually used for RAMdisks, a full 704K could be useful to you after all. Be careful, though, since some of these RAMdisk programs don't know enough to stop at 704K and will try to use the IBM Monochrome Display Adaptor's segments as a RAMdisk since there's no gap between addresses in that area and the user memory.

The maximum possible memory depends on what model PC you use.

The PC Tutor solves practical problems and explains points of general interest. If you'd like to see your questions answered here, drop a line to PC Tutor, *PC Magazine*, One Park Avenue, New York, NY 10016. ■

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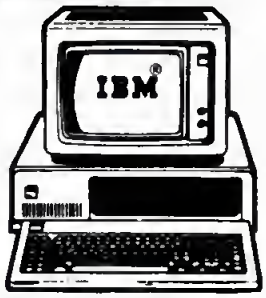

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Low-Budget Communications

Modems using the Bell 103 communications protocol provide no-frills, 300-baud connection between micros at low cost. Here are a few you might want to consider when you shop.

The crowded modem marketplace can be confusing, but you can simplify your search by determining your main concern before you begin to shop for one. If you're looking for a relatively inexpensive way to get your computer communication over the phone lines, a modem that is compatible with the Bell 103 protocol is your best choice.

The Bell 103 protocol is the oldest and most widely used scheme for modem communications. Its typical transmission rate of 300 baud (roughly 30 characters per second) is sufficient for most purposes. Perhaps most important, 103-compatible modems cost less than modems that use other protocols; 103-compatible modems come in a wide range of prices and features. Here's a look at some popular standalone modems that connect to your PC through a cable that plugs into the communications (RS-232) port on your system.

Hayes Smartmodem 300

The Smartmodem 300 is probably the most popular of the intelligent 103-compatible modems, and along with other Smartmodem models, it has become the de facto standard against which the competition is measured.

The Smartmodem is a full-featured, direct-connect modem (it plugs directly into the phone system).

The "smarts" in the Smartmodem come in the form of firmware—programs written on a chip and installed permanently in the modem. This lets you control the modem either by typing simple commands at your keyboard or by using software. The Smartmodem 300 has 19 commands plus 16 registers that are the same as those for all Smartmodem models. Any communications program written for the Hayes command protocols will work with any Smartmodem model.

The Smartmodem 300 has five operating modes: manual answer, manual originate, automatic answer, automatic dial, and automatic reverse dial (in which the modem will dial the phone and then go into answer mode). It also has a bank of seven status lights that keep you posted on what it's doing.

The Smartmodem 300's only drawback is its price. But at $289, it is still significantly cheaper than modems using other communications protocols. If your major aim is low-budget communications, the Smartmodem may be more modem than you need. You may not want to pay for what amounts to sports car instrumentation on a low-horsepower, economy-model hatchback. If that doesn't bother you, though, this is the one to get.

(continues)

Illustration: Michael Ng

Novation J-CAT

The distinctly atypical, direct-connect Novation J-CAT is smaller and lighter than most modems—roughly the size and shape of a bar of soap. Novation suggests mounting it on the side of your phone, but I consider this arrangement clumsy and have yet to find a convenient place for it.

The J-CAT is atypical in other ways, too. It doesn't require you to manually set it for either answer mode or originate mode. The J-CAT jumps back and forth between answer and originate modes, hunting for another modem to talk to. When it finds one, it locks itself into the proper mode. The J-CAT also has an auto-answer mode and an auto-dial *capability*, meaning that the modem is capable of dialing the phone but requires a program to tell it what to do.

> The Novation J-CAT may or may not work on your PC, depending on which communications card your machine has.

One last, and very important, note. The J-CAT works only with selected communications cards. According to Novation, the J-CAT works with cards from Personal System Technology, Apparat, Quadram Corporation, AST Research, Seattle Computer, Chrislin Industries, PC Square, Tecmar, and STB Systems. It doesn't work with cards from Sigma Designs, Automated Business Machines, Datamac Computer Systems, Alpha Byte, and IBM.

VOLKSMODEM

The low-cost, direct-connect VOLKSMODEM is both easy to install and easy to use. "Easy to install" because it comes with its own RS-232 cable and all you have to do is plug it in. "Easy to use" because it's so basic.

To use the VOLKSMODEM, establish a phone connection, then turn on the modem. The phone goes dead, and the modem generates an audible tone. When it has established communications with another modem, the tone stops. The VOLKSMODEM automatically sets itself to answer mode or originate mode as appropriate, but it has no auto-answer or auto-dial capabilities.

The VOLKSMODEM is one of the least expensive modems available. If you're looking for no-frills communications at bargain-basement prices, this is probably your best choice.

LEX-11 and LEX-12

Unlike the above modems, the LEX-11 is acoustically coupled, meaning that it communicates through a phone handset. The handset fits into two rubber cups on the modem—the modem "speaks" through a built-in speaker, and "listens" through a built-in microphone. Thus, you can use this modem in situations where you can't plug directly into a phone line.

> The LEX-11 is an acoustically coupled modem, meaning it sends and receives communications through a phone handset.

To use the LEX, you establish the phone connection, place the handset in the rubber cups, then turn the modem on in either answer mode or originate mode. The Lex is also available for purchase in a battery-operated model for use with a portable system.

Also worth looking at is the LEX-12. This modem is virtually identical to the LEX-11. Like the LEX-11, it can switch from a direct-connect modem to an acoustically coupled modem. While expensive, the battery-operated version of the LEX-12 is an extremely flexible telecommunications device.

That completes this whirlwind tour of some Bell 103-compatible modems. Keep an eye out for a look at the software side of communications. ■

PC FACT FILE

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Hayes Microcomputer Products, Inc.
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Norcross, GA 30092
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CIRCLE 772 ON READER SERVICE CARD

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IBM Cluster

PC Tech Journal's coverage of linking PCs together continues with a technical review of the Cluster Program, IBM's first offering in the PC-interconnection sweepstakes.

Communications Products from IBM

Two technical reviews will examine Version 2.0 of the *Asynchronous Communications Support* and an electronic mail package for the PC, the *Personal Communications Manager*.

Assemblers

Advanced macro techniques using ASM-86, plus macros that allow access to the power of assembly language and the convenience of structured programming, will be explored. Also, a look at Digital Research's PC-DOS assembler, RASM-86.

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Oenophiles rejoice! Now you can refer to a convenient data file to learn about various quality wines. In our previous two issues, we detailed the wines of France and Italy; now we offer our final installment treating the wines of California. From Chardonnay to Zinfandel, the state's most popular wines are evaluated according to grape variety. Learn about the origins and distinctive characteristics of these grapes, the wineries that produce them, and the vintages that are worthy of notice. Gather enough information to stock your cellar and intimidate wine stewards.

Curve Fitter

For those who work with mountains of data yet are not mathematically inclined, this program is a lifesaver. *Curve Fitter* helps you assemble and plot a set of data and then determines the relationship among the points. Using the least-squares fit regression method, the program chooses the type of curve that best fits your data, then plots it against the data points. The resulting curve—linear, exponential, second order, logarithmic, or power—helps you make projections. You'll never need to plot with paper, pencil, and eraser again!

Label Maker

If your personal or professional mailing list has degenerated into a motley assortment of tattered scraps overrunning your Rolodex, the time has come to seek help. With *Label Maker*, you can manage and store any kind of list, format tens of thousands of addresses to fit your label stock, and sort them alphabetically, up to 5,000 at a time. At home or in the office, you can become a pro at managing your mailing list.

File Manager III

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The Independent Guide to IBM Personal Computers

Coming Up

Zenith PC

Though not spectacular, the new Zenith PC is a very solid and competitively priced machine, whether with or without a hard disk. Was the quality there when the Zenith name went on? Our review will help you decide if this "me-too" PC-compatible is the machine for you.

Storage Alternatives

There's no longer any need to limit your data storage merely to floppies and Winchester hard disks. We'll look at some new ways of storing huge amounts of information and retrieving it quickly. Bubble memory, for instance, can retain added memory even when you turn off the machine. The Bernoulli box employs the Bernoulli effect from physics to provide fast access to data. Another unit stores an impressive half-gigabyte of memory.

Thor

The god of thunder, agriculture, and war once bore the name of Thor; now a software package does. But this time, *Thor* stands for THought ORganizer and its developers claim that it "processes thoughts" in the same way that a word processor processes words. Basically, the package is a hybrid—part database manager and part word processor—that captures, classifies, and helps organize thoughts. Does *Thor* succeed in this dual role?

DisplayWrite 1 and 2

DisplayWrite 1 and *2* closely emulate IBM's line of dedicated office word processors. John Dickinson will look at how they stack up as word processors, as well as at IBM's marketing strategy for the products and at the original dedicated DisplayWriters from which they are derived.

Mindset

Tom Christopher compares the Mindset PC with a racecar: fast and powerful when it's running, but temperamental. Mindset features a phenomenal graphics system that can obliquely angle images and selectively erase colors.

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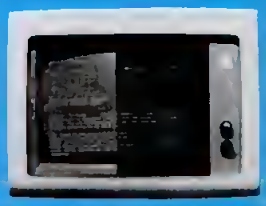

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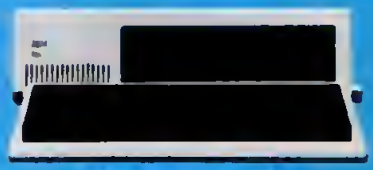

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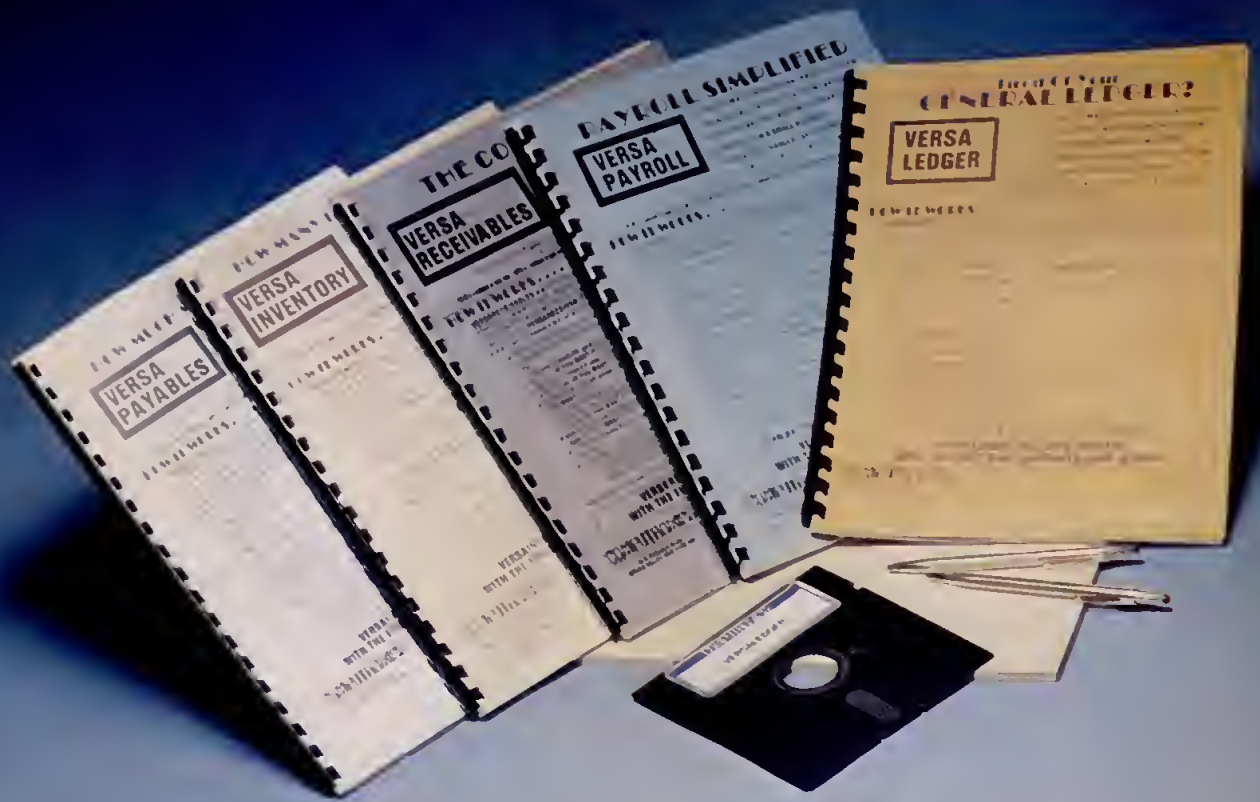

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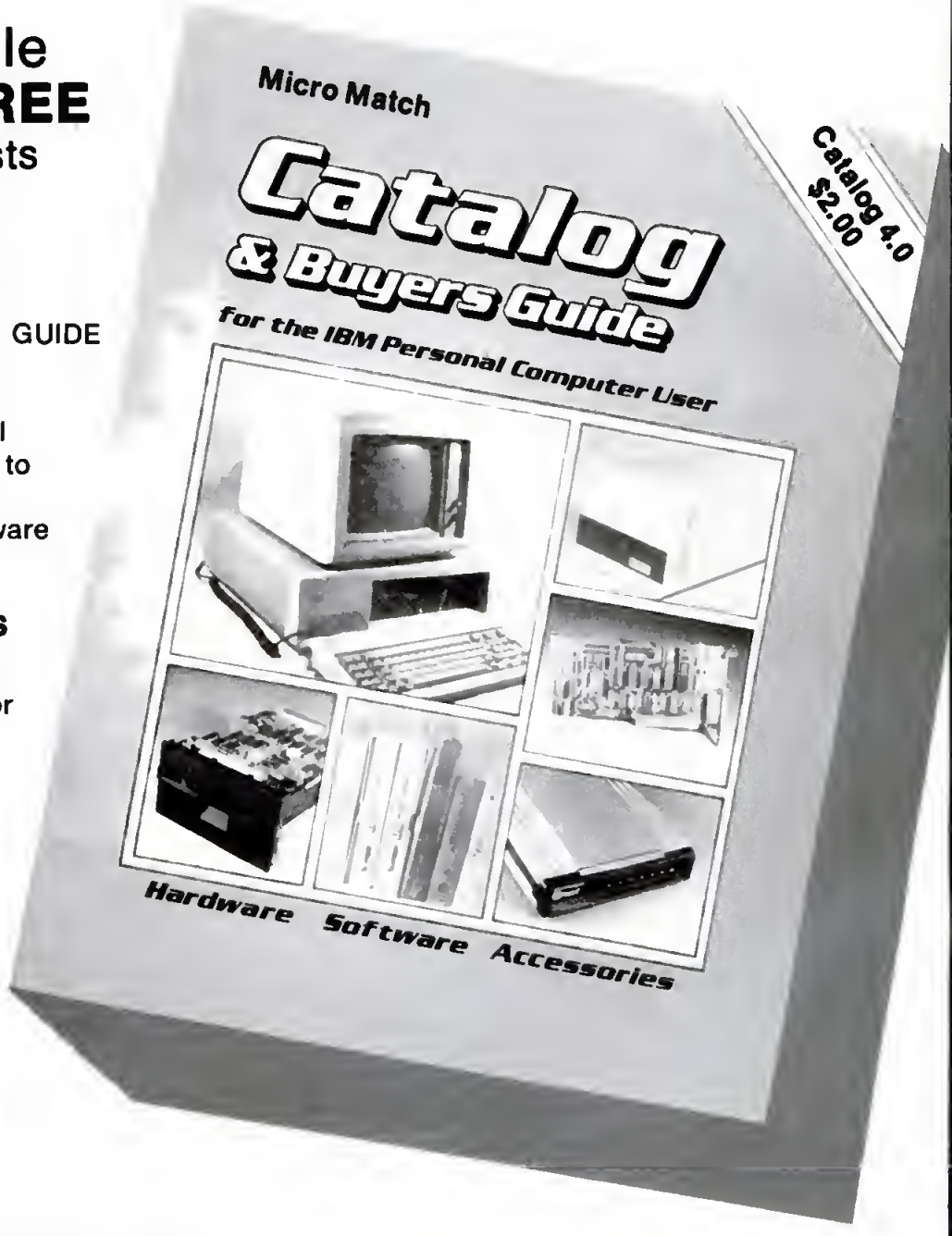

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On the Road with IBM: Vive la Différence à l'Expo

BY STEPHEN MANES

PARIS—In the shadow of the Eiffel Tower's technological wizardry, the Trocadero Gardens of Paris get one star from *Guide Michelin* for their surging fountains and broad-leaved trees. What better place to launch an exhibit with the theme of applying technology to the facts of nature?

Voilà! Under the spreading chestnut trees appears a bright, airy, plexiglass-and-wood quonset hut designed by Renzo Piano, a chief architect of Paris's controversial Pompidou Center. Inside is *l'Expo*, an IBM Corp. exhibit that will travel to 20 cities in 14 European countries over the next 3 years. Aimed at 15- to 24-year olds, the show struts IBM's stuff with a strong emphasis on applications.

"At *l'Expo*, the personal computer is king," declares one of the exhibit's lavish brochures. PCs and XTs (plus one lone Junior) are strewn about the hall, where they play interactive games, decipher voice commands, serve as videotex terminals, and generally do the things they do with great aplomb. But to those who've seen all that before, the real royalty of the show is its hands-on glimpse into the past and future of computers.

One exhibit takes a look at the development of a chip (called a *puce*, the French word for "flea" or "tiddlywink") from raw silicon to integrated circuit. Visitors are allowed to peer through a microscope at IBM's first mass-produced 64K memory chip, dating from the "historic" days of 1978. Also on display are the high-density, water-cooled panels that go into IBM's top-of-the-line mainframes, plus Model 3380 disk drives with on-line storage of 2.5 gigabytes and access to 3 megabytes per second.

Super Screens

Model 3290 gas plasma screens, with their peculiar hi-resolution orange glow, which IBM has been quietly unveiling over the last several years, are almost as plentiful as PCs at *l'Expo*. Even more stunning are the highly realistic, 256-color floral images displayed on the Model 5080. And a Model 7350's demonstration of image enhancement lets you zoom in close on an aerial view of Paris.

Demonstrations of voice input include a particularly impressive experimental program designed to "visualize" sound and help deaf children learn to speak more clearly. Various graphics tablets let visitors modify images and add captions to droll cartoons. Touch screens and icons have appeared in U.S. exhibits, but if IBM Europe has secret plans to join the Xerox Star and Apple Mac/Lisa bandwagon, it keeps them well hidden at *l'Expo*: not a single mouse is in evidence.

Esoteric hardware, on the other hand, is all over the place. The Model 4250 photocompositor is there, setting reproduction-quality type and illustrations on aluminized paper. A Model 7535 industrial robot grasps U.S. Olympic coins and slugs in its spidery fingers and, under the guidance of a PC, puts them through a series of tests to distinguish the genuine from the fake.

Lasers get their due in the form of glass-slicing tools and holographic supermarket scanners. And a film from Big Blue's Zurich labs puts you closer than ever to the submolecular world with the help of a computer-enhanced "tunnel effect" microscope that is able to take three-dimensional views with a vertical resolution of approximately *one atom*—almost 500 times better than previous limits.

Though *l'Expo* is hardware heaven, the show brochures are also notable, especially in contrast to IBM's dry U.S. brochures. One brochure, attempting to show how reality can be represented by a network of relationships among facts, uses such disparate concepts and personalities as infinity, death, Yuri Gagarin, Phaëthon, and Teotihuácan to come up with a working definition of the sun.

In the master brochure, along with results of a poll of European youth (significantly more are interested in sports, arts, and leisure than in science), is the most surprising image of the whole show: a photo of Elvis Presley juxtaposed with album covers of the Beatles' *Rubber Soul* and the *Nina Hagen Band* illustrating an article, "Music and the Young: 25 Years of Rage, Myths, Fashions."

What's remarkable about this piece is that it must be the first official IBM document that recognizes the existence of Frank Zappa, Lou Reed, the Velvet Underground, the Clash, and—may God save the Queen—the Sex Pistols. So the most important question about technology and nature that *l'Expo* raises may well be this: Will the PC*jr* be marketed overseas as a punk computer? ■

Western Union's EasyLink Taps Into Tymnet

UPPER SADDLE RIVER, N.J.—Western Union's EasyLink electronic mail service is now only a local call away in more than 450 cities, thanks to Tymnet.

When the EasyLink service was first offered, there were 16 "Metropolitan Area Connect Numbers," which were part of Western Union's own packet-switching network; subscribers outside of these areas used a toll-free number.

While the announcement to subscribers didn't mention Tymnet by name, Western Union now uses this national packet-switching network to provide additional access to EasyLink. The changes come after the U.S. Postal Service has cut back its electronic mail service.

Give and Take

Perhaps the best news is that there is no additional charge for using these local numbers. As before, Western Union charges only for sending messages, not for receiving them. The charges are based on time, and vary depending on the baud rate used, with discounts for off-peak and volume usage.

The "give" in the announcement is tempered with a little "take," however. One of the company's reasons for adding the Tymnet connections was the high cost of the toll-free service, according to a Western Union spokesperson. As a result, it has added a 15-cents-per-minute surcharge for connection to the toll-free number, effective in August. Also, any EasyLink message that has been left in a subscriber's "mailbox" more than 10 days will be delivered as a Mailgram Message, with a 50-cent charge to the recipient. This guarantees any message sent will eventually be delivered, even if recipients forget to check their EasyLink mailboxes.

Nearly half of the 60,000 EasyLink subscribers use microcomputers to hook in, and the percentage is growing rapidly.

Western Union also has aggressive plans to release a microcomputer communications program to simplify creating your messages off-line and to completely control dialing EasyLink, signing on, sending the message, and signing off. The program, due late this summer, also accesses other on-line services, and is expected to be just the first of many new products and features scheduled for the next 6 months, Western Union said.

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